

West Central Area Schools

Preliminary Report



November
20, 2017

PLANNING FOR TOMORROW & BUILDING TODAY

West Central Area Schools

Preliminary Analysis Report



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PROPRIETARY INFORMATION

This information contained herein is confidential and proprietary to Unesco and is not to be distributed or shared with anyone outside of West Central Area Schools.

EXECUTIVE SUMMARY



West Central Area Schools' commissioned Unesco to develop a Preliminary Analysis Report. This report, which starts the process of developing a long-term, capital-planning tool, aims to reduce the district's operating costs while strategically addressing aging infrastructure and improving the indoor environment. We are confident you will find this report supports West Central Area Schools' goals and objectives with efficient, effective, and economical solutions that address many of the challenges confronting the district.

This preliminary Master Facility Plan includes an innovative procurement method tapping existing resources/expenditures/authorities to improve schools by revitalizing and upgrading the physical learning environment. This approach is a result of Minnesota statutes that afford public school districts the opportunity to establish long-term partnerships with private businesses to assist in implementing and financing facility improvement measures (FIMs).

Unesco also identified several opportunities to enhance the indoor learning environment. Through Minnesota's Long-Term Facility Maintenance program, the district has bonding and levy authority to finance the cost of many of these improvements.

This plan includes a listing of major deferred maintenance projects in the district's facilities. In 2015, the Minnesota Legislature provided school districts with enhanced levy authority to address deferred maintenance needs. Blending leveraged savings with the Long-Term Facilities Maintenance levy will provide the district with a holistic, cost effective facility improvement program.

Interest rates continue to hover at 45-year lows, meaning borrowing money to finance projects is fiscally responsible. Further, construction costs are low, given the current, competitive contracting environment; combined, this environment of low-interest financing and low construction costs has created a "perfect storm" for facility improvements. Because much of the work associated with the recommendations included in this report is simply "unavoidable," a strategic, long-term plan is the most cost-effective way to handle these issues – and now is a good time to take action.

Presently, we are at the second step (of eight) in the progressive path to implement a Master Facility Plan with West Central Area Schools'. To proceed to the next step, Unesco requests your approval of a **Master Planning Agreement (MPA)**. This will authorize Unesco to continue the process of developing a Master Facility Plan for your district. A sample agreement is provided at the end of this report.

We believe our solution to modernizing your schools is your best chance to deal effectively and completely with aging/deteriorating facility infrastructure and the challenge of providing a student environment conducive to learning. With that in mind, consider a Master Facility Planning partnership with Unesco and place your students in an environment that fosters excellence and achievement.

FACILITY PLANNING & OPTIMIZATION DESCRIBED

Planning Process and Objectives



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

Goals / Objectives / Challenges / Opportunities

Ultimately, as stakeholders in West Central Area Schools, your goal is to envision West Central Area's future, to establish priorities, and to develop a plan for achieving those objectives. **We can assist.**

Understanding the External Pressures Affecting Minnesota Schools

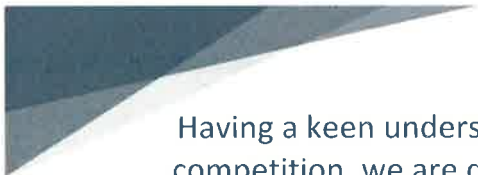
Most (if not all) Minnesota K-12 districts are faced with the constraints of reduced state aid and increased public sensitivity to local taxation. This fiscal environment presents revenue challenges, even for the best administrators and school boards...it's difficult to achieve your mission with fewer resources at your disposal. Administrators and school boards must find the delicate balance between expenses and revenue, and more specifically, between operational and capital needs. External pressures that affect districts across Minnesota include:

- **Uncertain economic environment** (unemployment, increased sensitivity to taxation, etc.)
- **Competition** for students (open enrollment, college-level/PSEO, online learning, home schooling, private and charter schools, etc.)
- **Rising operational costs** (e.g. staff, utilities, maintenance, etc.)
- State academic standards

Aligning with Your Strategic Objectives

We have assembled a team with unique qualifications in the arena of facility modernization. It would be our intent to implement an "integrated planning" approach at West Central Area Schools; we would link Academic, Strategic, and Physical Planning. We would use resources wisely, to work collaboratively, to innovate and do what is uniquely right for West Central Area Schools, as opposed to the "cookie cutter approach" applied by many architectural, engineering, and construction management firms. We have worked with numerous other districts with similar characteristics to those of West Central Area Schools.

Unesco is Minnesota-based and has worked extensively with K-12 districts throughout Minnesota by developing, funding, and implementing Master Facility Plans. For some companies, K-12 schools are only a small segment of their business, as they attempt to be all things to all people. We work all day, every day, with Minnesota K-12 education clients and have amassed a firm understanding of the unique concerns, issues, limitations, and challenges facing today's Minnesota school districts.



Having a keen understanding of our competition, we are quite confident no other company has the technical experience and expertise of Unesco.

Our in-house professional services pool spans the spectrum of each discipline required for thorough assessment and implementation of education facility initiatives.

By focusing all our efforts on education, our team has a keen understanding of the unique challenges you face. Likewise, we have developed the skill set and resources specific to your needs: specialists in school planning, finance, engineering, and project management, along with other technical experts that work exclusively with educational facilities. We are prepared to support West Central Area Schools' strategic objectives:



Unesco Helping Districts Overcome Challenges

Having worked with forty-six Minnesota K-12 districts, our team has encountered a wide range of challenges that confront the administrators and school boards with whom we have worked. Some of the challenges we help overcome include:

- Facilities are not well suited to serve 21st century education (e.g. science labs, technology infrastructure, etc.)
- Capacity issues – not enough space and/or too much space (and in the wrong location)
- Local taxpayers are overburdened ⇒ difficult to increase taxes
- Cost cutting has reached limits
- Aging, inefficient, and unhealthy facilities infrastructure
- Escalating operating costs



To overcome these (and many more challenges), our team will help you develop, fund, and implement a Master Facility Plan. A comprehensive approach will help you optimize your buildings for not only the present, but also provide the flexibility you need to change with the ever-evolving environment of education. We have developed the unique skill sets and proven methodology to help you evaluate your facilities, weigh and compare options, explore funding alternatives, and implement the best solution for your specific needs.

Planning Objectives



Support District Strategic Planning

- Develop both long-range (strategic) and short-range measures
- Evaluate facilities in terms of operating cost efficiency
- Evaluate facilities in terms of supporting educational programming



Positively impact district financial and operational performance

- Significantly reduces operating cost
- Minimizes local tax impact



Consider features that are proven to positively impact student achievement

Rewarding Results

A safe, comfortable, productive, and healthy environment has been shown to enhance student performance, along with helping attract and retain the best educators. Our team has the knowledge and tools to improve the learning environment that supports your teaching and staff requirements. With educational needs and demographics changing, schools need to take action. The plan is simple – to optimize facility and maintenance operations. As a result, you can better position your schools to succeed in an increasingly competitive K-12 marketplace. Whether you're updating older buildings, or building new from the ground up, our team can provide a quality learning environment that will enable your district to set yourselves apart from the competition.

Our team supports MN K-12 districts by providing healthy, safe, productive, and educationally appropriate learning environments that contribute to:



Student **Performance**

- Create a more comfortable and healthy environment for students, staff, and community
- Contribute to reduced absenteeism, higher attentiveness, and student performance



Reduced **operating costs**



Enhanced **competitiveness** for open enrollment students



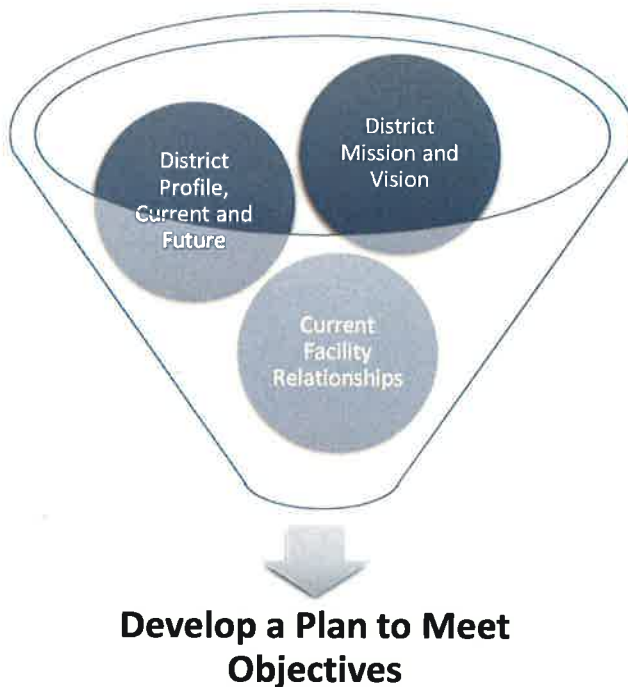
An enhanced perception of the district; source of school spirit and **community pride**



Local **job creation**

- According to the U.S. Department of Labor, each \$1M of project creates 20 high paying jobs for one year

Unesco's Planning Philosophies



Our educational Facility Planning and Optimization process is grounded in a collaborative, best practices approach tailored to the needs of the community, faculty, staff, and students of West Central Area Schools. Our process aims to create 21st Century education environments while prioritizing maintainable spaces, sustainability, first-time and life cycle costs.

This Preliminary Analysis Report represents what we hope is the continuation of a collaborative and holistic process which will allow us to work together as a team to develop long-term design solutions that will serve to enhance the West Central Area Schools' mission for many years to come.

Our design professionals are recognized leaders in the planning and design of educational facilities. More importantly, our team is comprised of partners and individuals that are passionate about working together to identify all project opportunities, and to develop thoughtful and comprehensive designs that will stand the test of time and will gracefully adapt to changes in teaching methodologies.

In order to develop comprehensive facility designs, our team maintains an unshakable belief in the following principles and philosophies:

We come to this project with **no preconceptions** about the final design solution. While we have a significant amount of experience with educational facility projects, we understand that West Central Area Schools' program needs are unique and demand unique design solutions.

We are **collaborative** and our process fosters an environment of collaboration between the community and West Central Area Schools' administration, faculty, staff, students, maintenance personnel and the design team. This approach ensures a deeper level of understanding, trust and enables exceptional design solutions.

We are committed to **integration**, not just coordination. Successful educational facilities demand fully-integrated infrastructure and systems.

We believe that every decision and every direction taken during the planning and design process should **add value** for West Central Area Schools, and we will focus all of our efforts toward that goal.

All of our design solutions are **client driven**. These facilities belong to the community, faculty, staff, students, and administrators who occupy them long after the initial design and construction activities.

We believe in **sharing knowledge** among all team members. The open exchange of ideas and concepts leads to stronger design solutions.

All design solutions must be **flexible**, adaptable and efficient so that infrastructure and systems can be easily modified and adapted to support future changes.

Education facilities must also be designed to be efficient and **sustainable** to ensure stewardship of our environment now and for future generations.



GUIDING PRINCIPLES

Our process is interactive, collaborative and best defined by five specific terms:

Engage...

Listen...

Learn...

Share...

Respond...

These principles guide our design solutions throughout the process.

For our team, this process is highly interactive and collaborative. It relies upon direct involvement and input from the community, administration, faculty, staff, students, and maintenance personnel at West Central Area Schools throughout the process. It is a process best defined by five specific terms:

Engage...

The most critical time for any project is at its inception. It is the time when the team that will direct all project activities and outcomes is built. It is a time of engagement, where all players are introduced to the planning and design process; it is the first opportunity to set the tone for the project, a tone based on inclusiveness and excitement. It is about a commitment among all team members to work together to identify and address all project opportunities. The

engagement process is accomplished through a number of initial meetings that all occur at West Central Area Schools.

The first of these meetings is typically a stakeholder meeting to discuss the global objectives of the project associated with the mission and vision of West Central Area Schools. This meeting will define the overall communication and decision making process that will serve as the structure for the project throughout the process. It will ultimately enable the communication of the district perspective to all building users and stakeholders. Immediately following the stakeholder meeting, we will convene a meeting with all affected West Central Area Schools' faculty and staff members to gain their unique perspectives about the program needs, and more importantly, allows us to engage in an interactive discussion about the planning and design process, including the critical role that they play in defining the project outcome.

After meeting with the West Central Area Schools faculty and staff, we invite students to a forum session to gain their insights on project ideas. This important meeting lets students know that the district and the design team are interested and concerned about their input.



Engaging in ideation / visioning sessions with staff will provide needed insight, insight that will help frame the facility planning initiative.

One of the final engagement exercises is a meeting with West Central Area Schools' facilities and maintenance personnel to let them know that we value their perspective on the systems and design solutions that we tailor for this facility project.

This engagement process is critically important to the project. It also allows us to build excitement about the project, and to encourage the open exchange of ideas throughout the process. It lets everyone know that their input is of value, and, there is a vehicle for discussions and decisions.

Listen...

The most important skill that we possess is the ability to listen. We will always listen to what you say, and we will develop solutions that uniquely satisfy the goals and objectives that you identify. This is not our building project. This project is first, foremost and always about you.

Learn...

We sincerely believe that the only way we can assist West Central Area Schools on the development of holistic project design solutions is to understand what makes West Central Area Schools unique, to learn about where you have been, and where you want to go. This learning process is about understanding the limitations and constraints that influence the district today so that we can help you capture the vision for tomorrow and to create solutions that maximize project value.

Our learning process is multi-faceted, research based, and is tailored to satisfy the specific needs of West Central Area Schools. The most important tenant of the learning process is that all activities will include the West Central Area Schools users and stakeholders.

These activities may include:

-  Benchmarking similar facilities, classroom environments, collaborative and student success spaces, support spaces instructional technology systems, etc.
-  Attending classes to understand current teaching pedagogies and facility constraints and limitations.
-  Meetings with district facilities and maintenance personnel to discuss the planning and design of facility systems, equipment, and finishes. These meetings allow the design team to understand concerns relative to the long-term maintenance and care of the renovated facilities on the West Central Area Schools' campus. They also allow the team to begin the early development of project-specific specifications and design solutions tailored to address district concerns.

Share...

This part of the process is based upon a series of iterative meetings that start during planning and programming, continue through design and documentation phase of the project.

These meetings are conducted for every space and every system associated with the project. These information gathering and sharing sessions include discussions on current trends that impact the planning and design of contemporary science facilities, including transparency, recruiting and retention, a focus on student needs, new instructional pedagogies, instructional technology and distance learning, hands-on experiential learning, shared equipment, the importance of collaboration, right sizing systems, plug and play components for flexibility and adaptability, and efficient and sustainable solutions.



We often invite students to a forum session to gain their insights on project ideas. This important meeting lets students know that the district and design team are interested and concerned about their thoughts/feelings.

Information gathering and sharing activities also include comprehensive discussions about programming and cost estimating. These efforts focus on assumptions used to define construction costs. The goal of these discussions is to ensure that all project team members share common and realistic budget expectations. It is critically important for all parties to understand all relative budget considerations so that informed decisions can be made regarding potential planning and design solutions.

It is also important for all design team members to share a complete understanding of specific educational program requirements. This understanding allows for continued planning efforts that are focused on addressing all West Central Area Schools' needs and goals. A major part of our effort relative to these program validation activities is to gain an understanding of each of the courses offered at West Central Area Schools. The goal to ensure that facilities are designed to be as flexible and adaptable as possible relative to the usage of each specific space.

Respond...

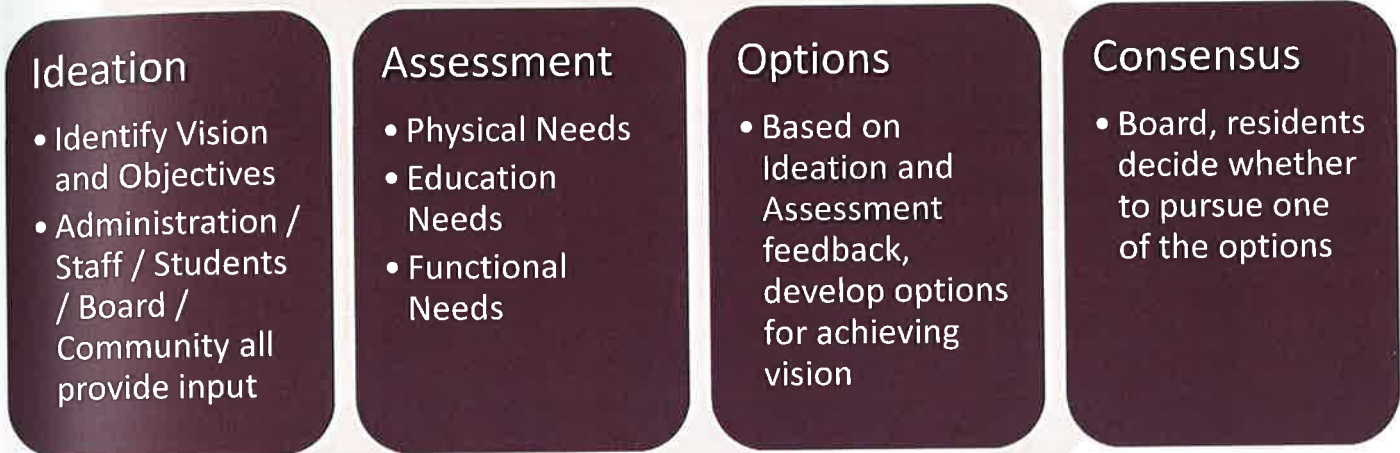


Once detailed information is gathered, our design team works to respond to all the goals and aspirations of West Central Area Schools by developing sustainable design solutions that serve to maximize value for current and future generations of faculty and students. The development of design solutions is collaborative, and is based on ensuring that project team members are fully vested in the final design concepts. To accommodate this

requirement, we must be able to clearly document and communicate all design ideas. We cannot forget that while our design team and West Central Area Schools' facilities personnel can easily understand two-dimensional documents; three-dimensional images enable a more comprehensive understanding of proposed design solutions. To communicating ideas, we use all the tools at our disposal, including **free-hand sketches, two-dimensional computer generated plans and details, and three-dimensional renderings of interior spaces.**

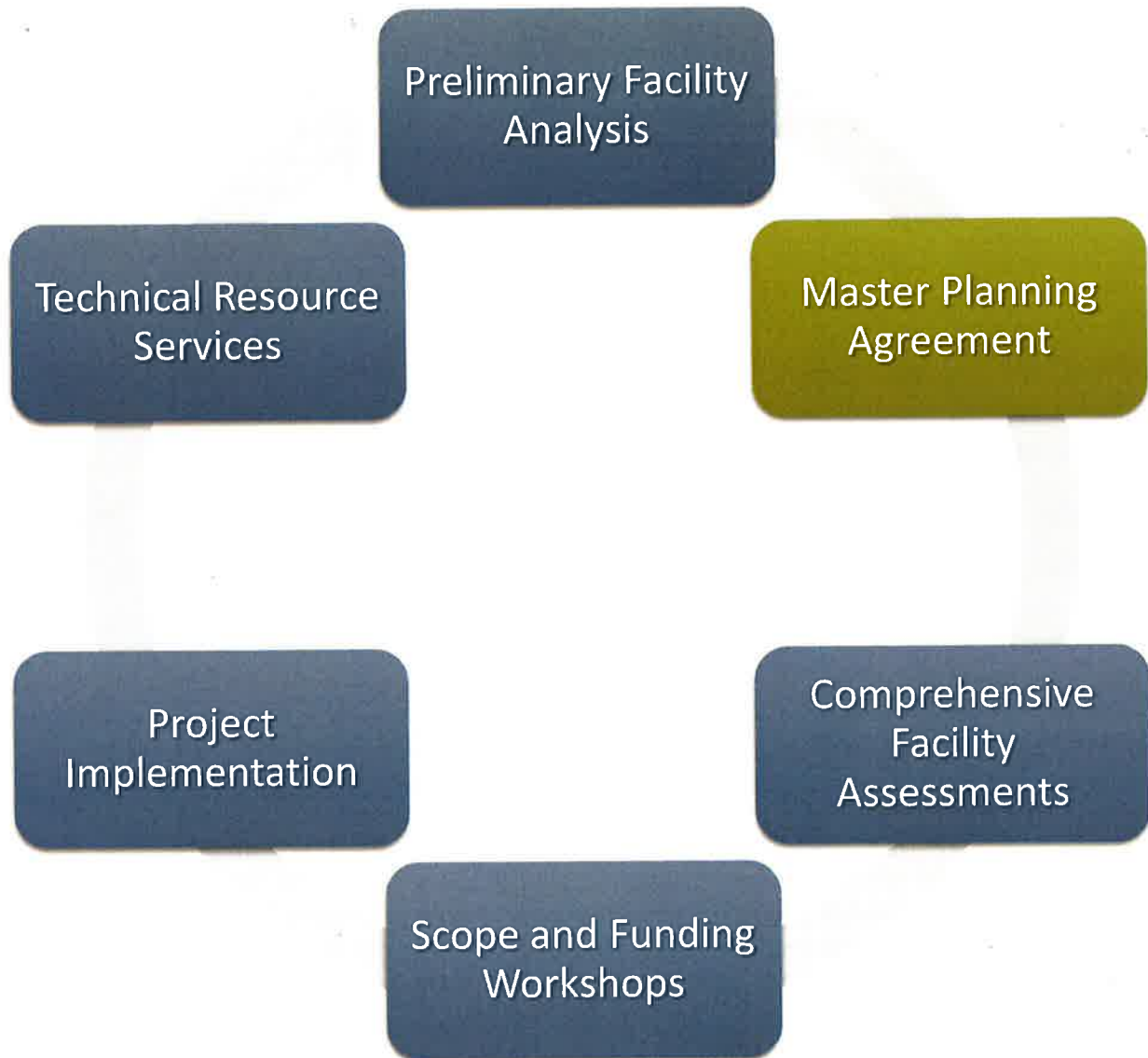
The goal of our team-based, comprehensive communication process with West Central Area Schools is design solutions that exceed the goals, vision, and expectations set for the project at the project start-up.

Planning Process Overview



Planning Process Milestones

Unesco will use the following approach for developing and implementing Master Facility Planning & Optimization:



Preliminary Facility Analysis ✓

Unesco has performed a preliminary energy and operational analysis of your facilities. Unesco has identified some potential facility improvement measures and energy conservation opportunities. Unesco has also demonstrated some potential cash flow scenarios to fund these improvements. This report is the result of this analysis.

Master Planning Agreement (current step)

The next step in the process is for West Central Area Schools to approve the concept of developing a Master Facility Plan for the district. Issuing a **Master Planning Agreement** will authorize us to commence with a comprehensive facility analysis of the district's facilities.

A sample Master Planning Agreement is included for your review at the end of this report.

Comprehensive Facility Assessments

Unesco will perform comprehensive assessments of your facilities. These assessments are intended to furnish West Central Area Schools with study findings, conclusions, alternatives, and recommendations which would assist the district's leadership in fashioning a comprehensive plan of action intended to achieve enrollment stability and growth, improve learning environments, and enhance effectiveness, efficiency, and cost/effectiveness of the district's operations.

The Assessment phase involves surveying and documenting current operational and physical conditions and deficiencies evident in the above-referenced buildings. The information documented in the Assessments will be gathered primarily through field observation and supplemented by evaluation of existing information and discussion with district personnel. The survey will review the appearance, condition, and current uses of the buildings. This data is used to determine the feasibility and cost of infrastructure replacement/enhancement, facility renovation/remodeling, reallocation, and/or expansion. The process includes a review of available existing floor plans and walk-through of all the buildings.



Physical Needs

- Safety and Security
- Operational Efficiency
- Quality of Environment
- Asset Condition / Reliability
- Site Evaluation



Education Needs

- 21st Century Education Considerations
- Educational Adequacy
- Curriculum & Technology



Functional Needs

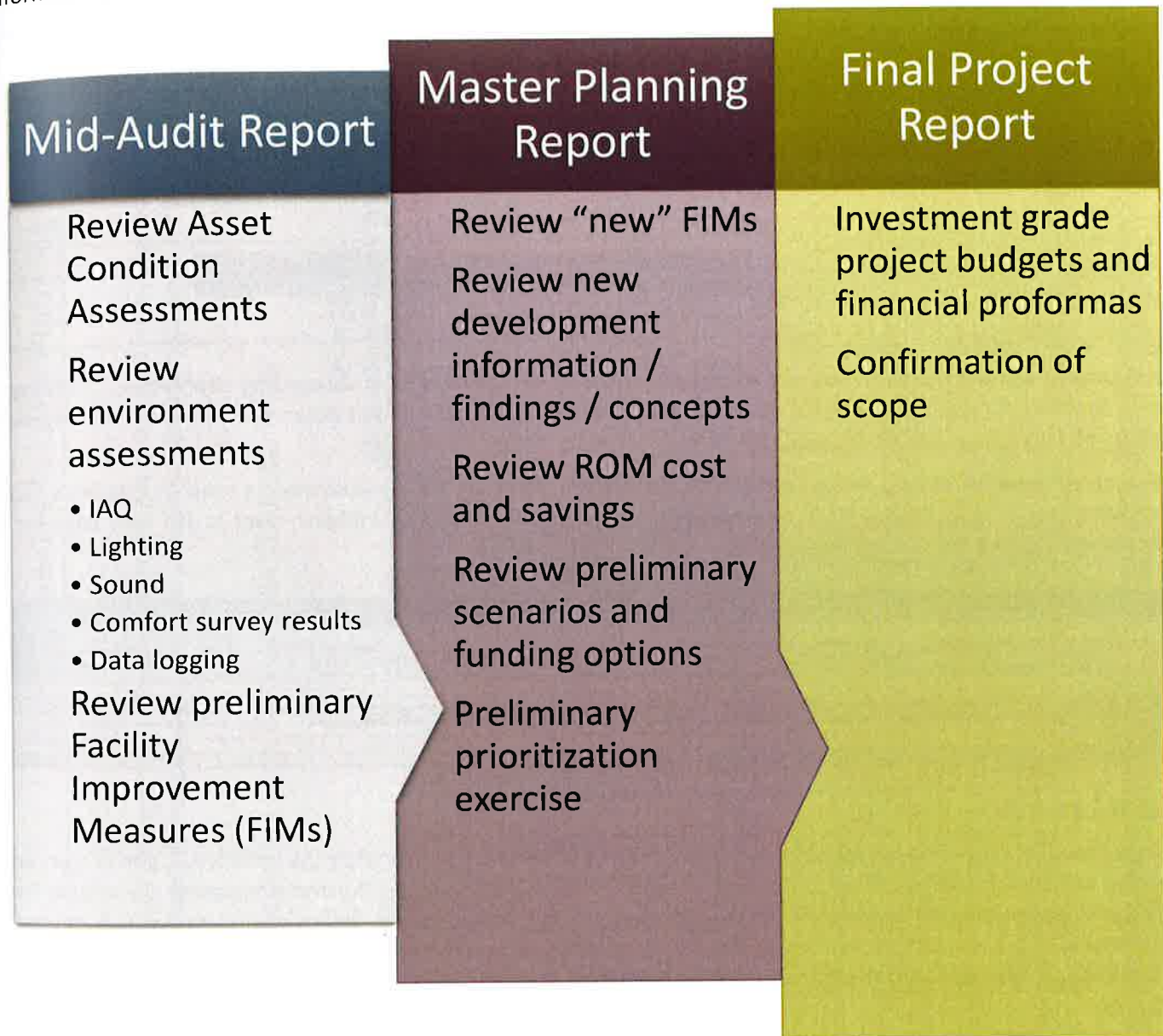
- Enrollment, Capacity, Grade Configuration
- Educational and Programming Needs
- Activities and Community

Comprehensive Planning in Support of Strategic Vision

Unesco will explore conditions and deficiencies in sixteen important areas, which are outlined as follows:

A	Accessibility	This section addresses the conformance of the facility to the intentions of accessibility requirements with focus on the following issues: accessible parking, an accessible route to the main entrance, ability to attain all levels of the facility, and access to each teaching space.
C	Controls and Energy Management	This section documents the existing controls and energy management systems, components, and their known deficiencies.
E	Electrical Systems	This section documents the existing electrical systems and components, and their known deficiencies.
EQUIP	Capital Equipment/Assets	This section documents the existing capital equipment and assets, and their known deficiencies.
EXT	Exterior Envelope Including Roofing	This section documents the existing exterior building envelope and roofing, including information supplied by the district.
G	Grounds, Site, and Surroundings	This section documents the existing site and its surroundings.
HAZ	Hazardous Materials	This section covers the information provided by the district concerning asbestos materials present and any lead in paint coatings.
INT	Interior Spaces and Finishes	This section documents the existing physical condition of the interior spaces and finishes within the facility.
LS	Life Safety Systems	This section explains existing life safety and code deficiencies as noted and as discovered during field observation.
M	Mechanical Systems	This section documents the existing mechanical systems and components, and their known deficiencies.
P	Plumbing Systems	This section documents the existing plumbing systems and components, and their known deficiencies.
PROG	Programmatic / Educational Adequacy Enhancements	This section consists of facility programmatic and deficiency issues as addressed by the various facilities' site administration and staff.
S	Electronic Security Systems	This section documents the existing electronic security systems and components, and their known deficiencies.
T	Technology Systems - Non-Instructional	This section documents the existing technology systems and components, and their known deficiencies. It covers only non-direct instructional technology infrastructure for the various buildings.
U	Utility Service Improvements	This section documents opportunities for operational cost reduction associated with enhancements to the facilities' utility services.
V	Ventilation / Dehumidification Systems	This section documents the existing ventilation systems and components, and their known deficiencies.

During the comprehensive facility assessment phase, Unesco will deliver three reports, each with progressively more information.



Planning Scope and Funding Workshop(s)

Unesco will facilitate planning workshops where Unesco will work with district stakeholders to review facility improvement needs / opportunities and their respective costs (and cost efficiencies). Together, Unesco and the district will assess the costs and benefits of each improvement and collectively develop the scope and implementation strategies for the Master Facility Plan.

Develop criteria for prioritizing projects

- Criteria based on baseline needs and priorities
- Criteria to emphasize equity and efficiency

Determine costs and funding recommendations

- Determine estimate of project costs
- Assess alternate funding options

Site-Based Plans

- Prioritized phasing of projects

Unesco will facilitate workshops where Unesco will work with the district to identify and evaluate all funding and financing alternatives. Together, Unesco and West Central Area Schools' decision makers will assess all options and determine the most cost-effective funding and financing approach for implementing the districts Master Facility Plan.

The result of these efforts is a long-range facility plan. The long-range plan is illustrated in tools as simple as Excel spreadsheets, and as sophisticated as cloud-based, client accessible databases (please refer to the next page for a description of a cloud-based tracking system).

Summary of Identified Facility Needs																		
Site	Priority / When	Accessibility	Controls and Energy Management	Electrical Systems	Capital Equipment & Assets	Exterior Envelope Including Roofing	Grounds, Site, & Surroundings	Hazardous Materials	Interior Spaces and Finishes	Life Safety Systems	Mechanical Systems	Plumbing Systems	Programmatic / Educational Adequacy	Electronic Security Systems	Technology Systems - Non-Instructional	Utility Services	Ventilation / Dehumid Systems	Building Totals
XYZ High School	2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	3-5 years	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	6-10 years	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	10+ years	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Project Implementation

Often, a "project" (grouping of high-priority improvements) will result from the planning initiative. Upon project and financing approval, implementation of the Master Facility Plan will commence. The implementation will include final design and engineering documentation of the selected facility improvements, award of installation subcontracts, management of subcontractors, training of school personnel, final commissioning, and approval of the installations. Concurrently, natural gas and/or electricity delivery contracts and/or utility negotiations will be consummated where pertinent.

Technical Resource Services

Upon completion of the installation of the facility improvements, Unesco may provide ongoing services including energy reporting, on-going facility monitoring (data analytics) and annual guaranteed savings reconciliation. In addition, any district- requested annual commissioning services and training programs would begin and continue on an ongoing basis.

West Central Area Schools

Comprehensive Facility Planning and Tracking System

A Master Facility Plan is often comprised of literally thousands of facility improvements.

The following are screen shots of “UnescoPlan,” a cloud-based database that enables a district to track a long-term facility plan actively and dynamically. Although there is significant depth and information that can be presented through a demonstration, the screen shots provide an overview of the power and flexibility of UnescoPlan.

Combining Thousands of Facility Improvements into Easy-to-Track Summaries

[illegible]

10-Year Facility Maintenance Plan

[illegible]

10-Year Facility Maintenance Plan





Tracking and Summarizing Improvements in a Cloud-Based, Multi-Year Facility Plan

Alternative Facility Projects Summary

Full Report Email More											
Construct Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
School Name	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)	Estimated Project Cost (tot)
Alice Smith	-	\$13,750	\$21,858	\$240,970	\$10,373	\$621,342	\$11,219	\$34,697	\$12,135	\$1,105,723	\$13,125
Bus Garage	-	\$7,020	\$46,239	\$12,486	\$429,010	\$766,978	\$43,274	\$76,192	\$96,347	\$27,612	\$7,993
District Wide	\$0	\$695,528	\$424,077	\$1,163,779	\$2,814,789	\$965,529	\$915,575	\$1,346,978	\$990,288	\$1,029,899	\$1,071,094
Eisenhower	-	\$52,339	\$13,872	\$56,585	\$150,418	\$12,484	\$645,301	\$13,502	\$14,042	\$14,604	\$15,188
Eisenhower CC	-	\$29,619	\$132,150	\$280,765	\$71,694	\$255,842	\$28,829	\$549,776	\$31,182	\$843,717	\$33,726
Gateway	-	\$10,722	\$11,151	\$310,250	\$139,910	\$10,035	\$10,436	\$10,854	\$792,467	\$11,739	\$12,209
Glen Lake	-	\$45,183	\$10,892	\$93,164	\$126,592	\$9,802	\$79,038	\$790,225	\$11,026	\$293,283	\$11,925
Harley Hopkins	-	\$16,106	\$6,610	\$17,592	\$281,513	\$5,948	\$12,006	\$6,434	\$10,436,583	\$265,148	\$7,237
High School	\$0	\$66,902	\$8,798,716	\$4,317,046	\$2,470,112	\$10,805,301	\$4,139,444	\$2,123,865	\$70,430	\$5,918,149	\$76,178
Katherine Curren	-	\$6,495,410	\$9,432	\$231,139	\$8,161	\$8,488	\$8,827	\$9,180	\$9,548	\$853,850	\$10,327
Meadowbrook	-	\$15,716	\$17,967	\$601,905	\$14,143	\$14,708	\$15,297	\$692,891	\$16,545	\$126,082	\$17,895
North Jr High	-	\$27,535	\$37,397	\$306,107	\$43,823	\$53,424	\$36,202	\$181,941	\$28,686	\$29,834	\$31,027
Tanglen	-	\$14,186	\$10,833	\$27,309	\$22,241	\$9,748	\$10,138	\$25,019	\$10,966	\$146,971	\$11,860
West Jr High	-	\$30,051	\$29,631	\$645,811	\$32,073	\$26,665	\$27,731	\$88,057	\$29,994	\$31,194	\$32,442
Totals (168 groups)	\$0	\$7,520,067	\$9,570,825	\$8,304,908	\$6,614,852	\$13,566,294	\$5,983,317	\$5,949,611	\$12,550,239	\$10,697,805	\$1,352,226

Example of a Multi-Year Facility Plan by Facility

Finance Code #	Name	School Name	Facility Category	Project Location	Facility System	Project Year	Construct Year	Project Description	Notes	Estimated Project Cost	CL	Finance UFARS Code
380	Indoor Air Quality Mechanical Systems	District Wide	Energy Mgmt & Controls	District-Wide	Controls	11	2016	Control Upgrades	Upgrade/integrate Allerton System	\$0		06 E Site 867 YYY 380 520
370	Electrical	District Wide	Electrical Systems	District-Wide	Electric	12	2017	TEGG - Electrical Survey, Report Items, Repairs	TEGG Program	\$84,500		06 E Site 867 YYY 370 520
380	Indoor Air Quality Mechanical Systems	District Wide	Energy Mgmt & Controls	District-Wide	Controls	12	2017	Controls Monitoring & Diagnostics - Schedules, Sequences	Re-commissioning of existing controls and systems	\$24,988		06 E Site 867 YYY 380 520
380	Indoor Air Quality Mechanical Systems	District Wide	Energy Mgmt & Controls	District-Wide	Controls	12	2017	Install EMS Analytics across ISD		\$65,000		06 E Site 867 YYY 380 520
384	Site Projects	District Wide	Grounds, Site & Surroundings	District-Wide	Landscaping	12	2017	Curb Appeal	TruGreen (GIVE Steep Slope to Prairie)	\$32,500		06 E Site 867 YYY 384 520
384	Site Projects	District Wide	Grounds, Site & Surroundings	District-Wide	Parking Lots	12	2017	Paving & Resurfacing	SAFEngineering	\$0		06 E Site 867 YYY 384 520
379	Interior Surfaces, Environmental H&S Mgmt, Asbestos Removal and Encapsulation	District Wide	Interior Finishes	Classrooms	Flooring	12	2017	Carpet/Soft Surface		\$65,000		06 E Site 867 YYY 379 520
379	Interior Surfaces, Environmental H&S Mgmt, Asbestos Removal and Encapsulation	District Wide	Interior Finishes	Classrooms & Hallways	Paint	12	2017	Paint Classrooms & Hallways	Budgeted painting for ISD based on total square footage	\$70,707		06 E Site 867 YYY 379 520
369	Building Hardware and Equip	District Wide	Life Safety	Roofs	Access	12	2017	Roof Fall Protection - HHS & ECC	Priority: 1-HS 2-JHS 3-Elern Approx	\$67,167		06 E Site 867 YYY 369 520
369	Building Hardware and Equip	District Wide	Life Safety	District-Wide	Security	12	2017	Replace defective / Out of date readers	Flexcomm Flexcomm	\$13,000		06 E Site 867 YYY 369 520
380	Indoor Air Quality Mechanical Systems	District Wide	Mechanical Systems	District-Wide	HVAC	12	2017	Condenser Coil Coating	Perform on remaining equipment	\$32,697		06 E Site 867 YYY 380 520
380	Indoor Air Quality Mechanical Systems	District Wide	Mechanical Systems	District-Wide	HVAC	12	2017	Refrigerant Additive	Perform on remaining equipment	\$21,836		06 E Site 867 YYY 380 520
380	Indoor Air Quality Mechanical Systems	District Wide	Mechanical Systems	District-Wide	HVAC	12	2017	Condenser Coil Cleaning - Placeholder for project costs. Actual invoices were paid on a building by building basis.	Perform on remaining equipment	\$130,787		06 E Site 867 YYY 380 520
380	Indoor Air Quality Mechanical Systems	District Wide	Mechanical	District-Wide	HVAC	12	2017	Refrigerant Additive - Placeholder for project costs. Actual	Perform on remaining equipment	\$87,344		06 E Site 867 YYY 380 520

Planning Summary

What?

- Long-range, strategic, facility planning aligned with district objectives
- Facility reinvestment/modernization; often more cost-effective than new construction
- Enhancements to indoor environments (e.g. air quality, comfort, acoustics, lighting)
- Educational programming (if needed); facilities that support 21st century education

Why?

- Improved student and staff performance
- Reduced operating cost
- Enhanced district competitiveness
- Addresses aging capital infrastructure; reduced risk of infrastructure failure
- Local job creation
- Improved community relations

Why Now?

Forty-five year low interest rates combined with low construction costs has created the "perfect storm" for facility improvements

How?

- Develop a comprehensive facility plan that aligns with district objectives
- Leverage existing district resources and levy authorities
- Utilize an approach with guaranteed results
- Leverage "free" money: grants, rebates, subsidized financing
- Referendum support (if needed)

Why Unesco?

- Record of accomplishment serving MN K-12
- The Unesco team has supported 49 MN districts to successfully implement over \$490MM of facility improvements
- Minnesota-based experience, expertise, and resources
- Transparent and cost-effective
- Single source of accountability
- Beyond energy: demographics, facility planning & optimization, new space design, health & safety

PHYSICAL NEEDS ASSESSMENT

Current Facility Profiles



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

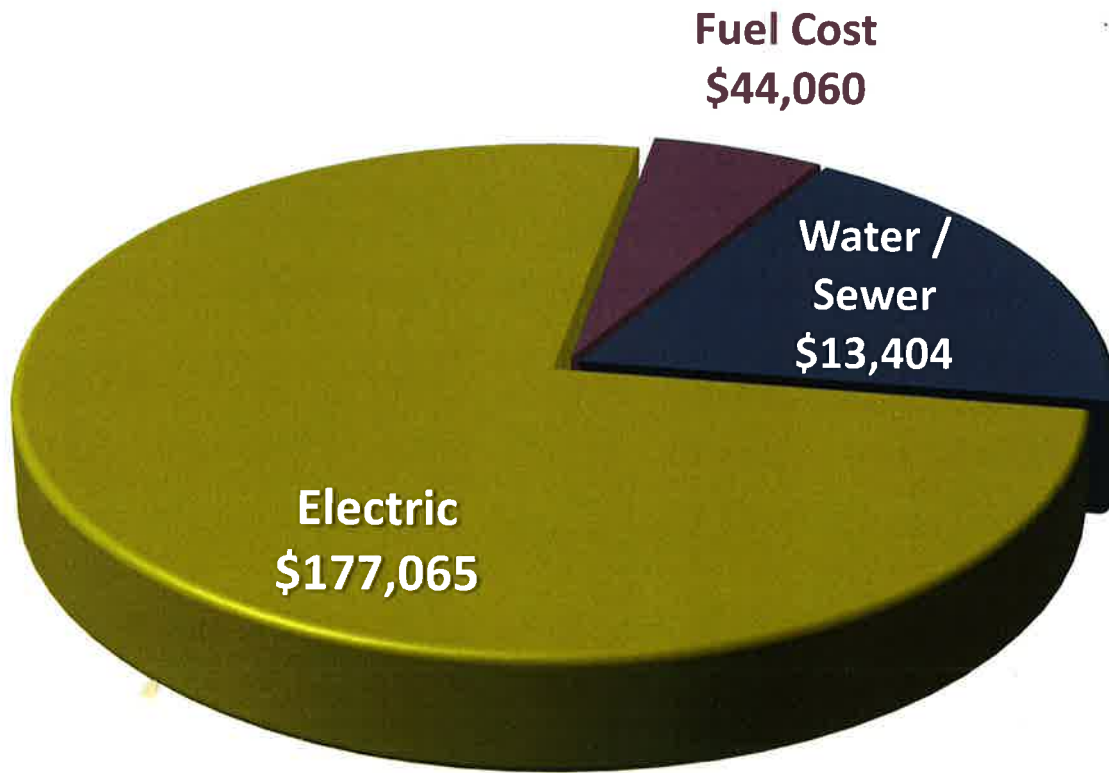
Operational Cost Assessment

Utility Analysis

Total annual utility expenditures for West Central Area Schools were supplied by the district.

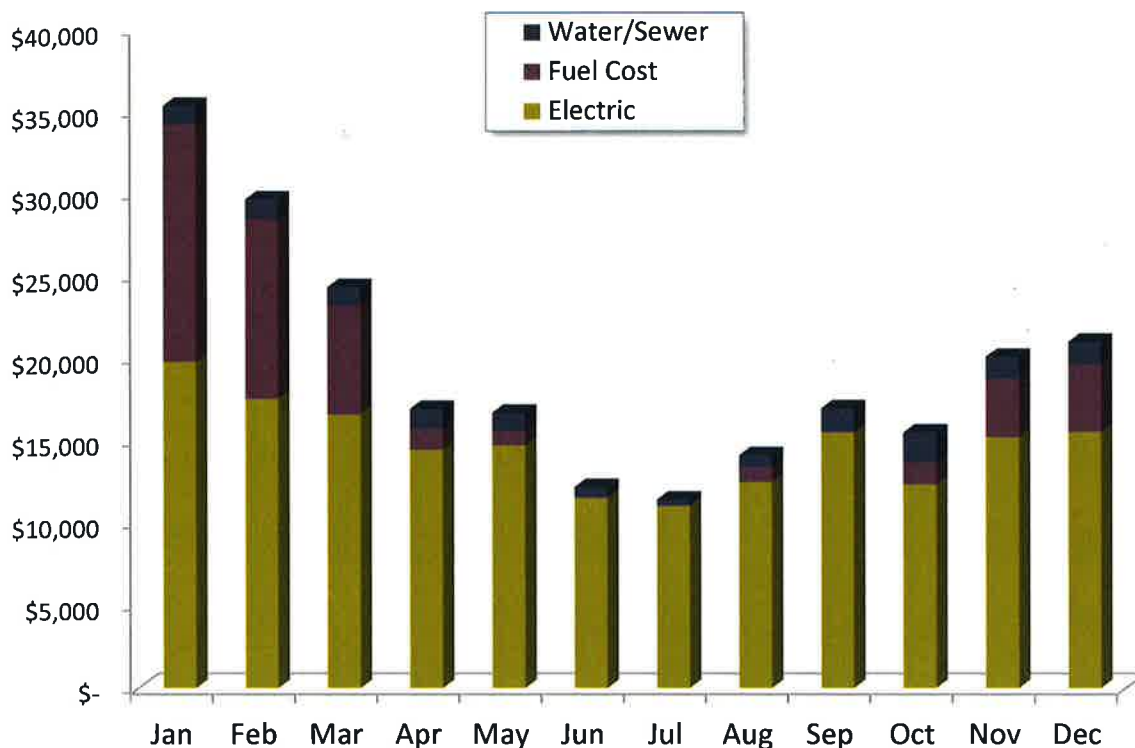
Utility Use Summary												
School	Average Cost/Consumption							Cost/Square Foot				
	Area	Electric Use (kWh)	Electric Cost	Fuel Use (Therms)	Fuel Cost	Water/ Sewer Use (kgal)	Water/ Sewer Cost	Total Cost	Electric Cost/SF	Gas Cost/SF	Water/ Sewer Cost/SF	Total Cost/SF
High School/Middle School	130,000	1,652,331	\$135,313			841	\$8,789	\$144,101	\$1.04		\$0.07	\$1.11
WCA North Elementary	75,181	232,886	\$25,777	23,582	\$25,249	245	\$1,951	\$52,976	\$0.34	\$0.34	\$0.03	\$0.70
WCA South Elementary	35,704	157,344	\$15,975	13,771	\$18,811	206	\$2,664	\$37,451	\$0.45	\$0.53	\$0.07	\$1.05
District Totals/Averages	240,885	2,042,560	\$177,065	37,353	\$44,060	1,292	\$13,404	\$234,528	\$0.74	\$0.18	\$0.06	\$0.97

Annual Utility Expense – District-Wide

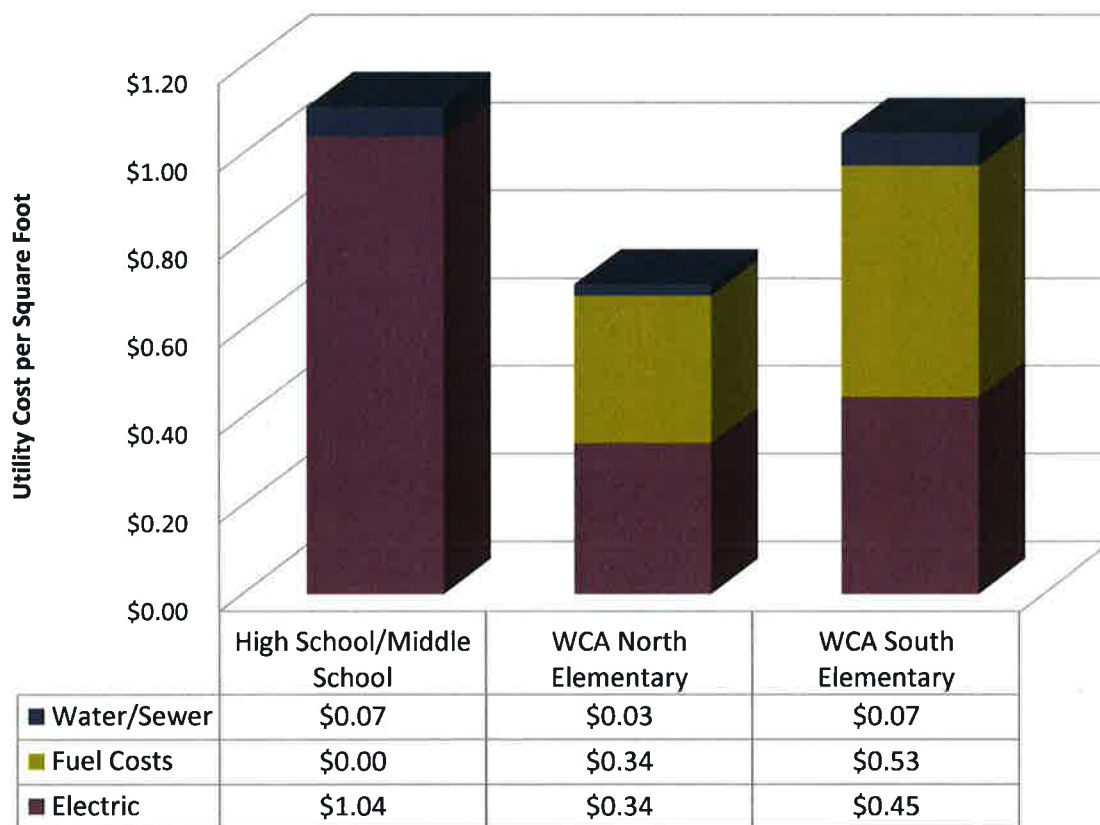


Total Cost/SF
\$1.11
\$0.70
\$1.05
\$0.97

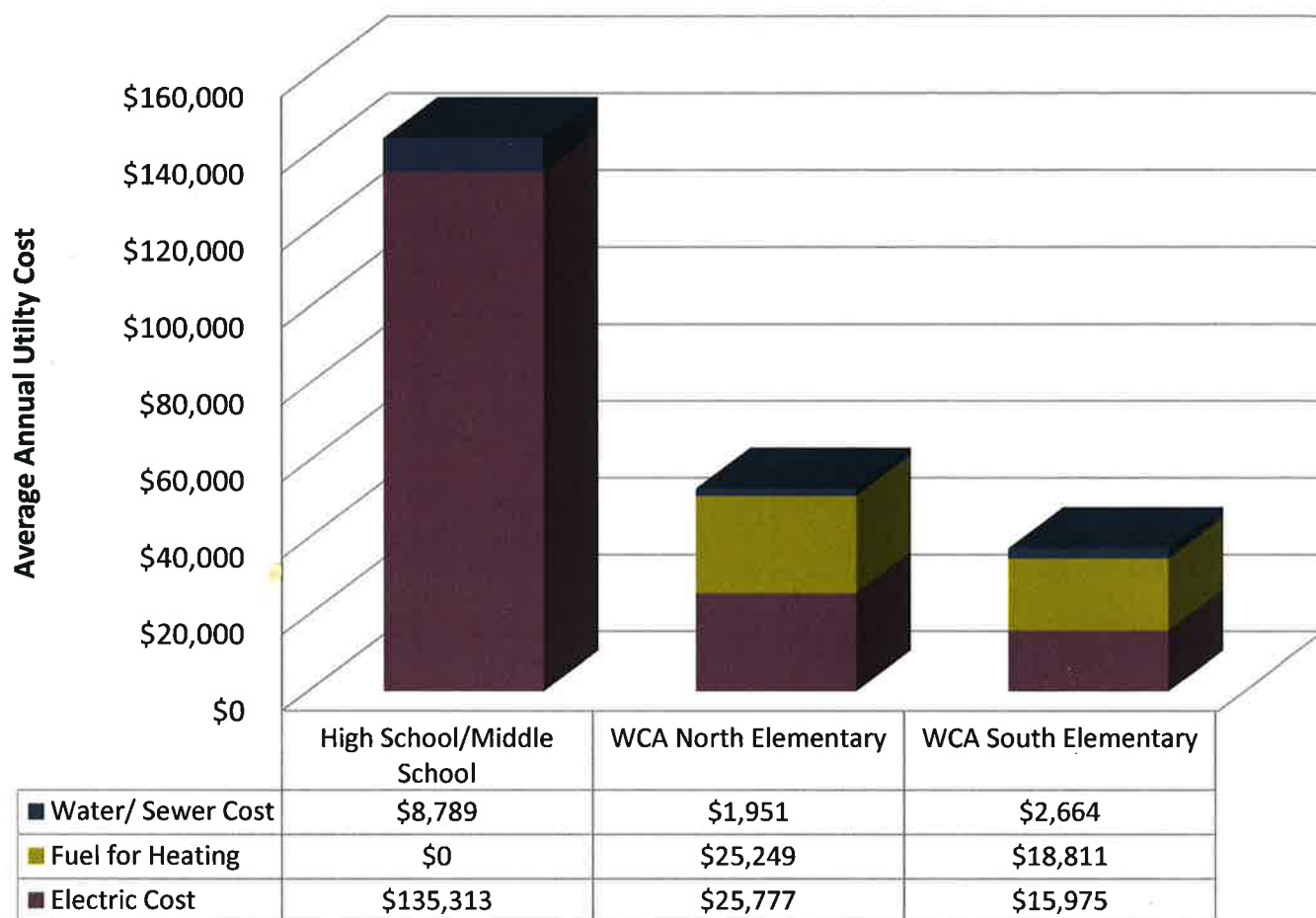
Annual Utility Expense – District-Wide by Month



Annual Utility Expense - Breakdown by Type (\$/Sq. Ft.)

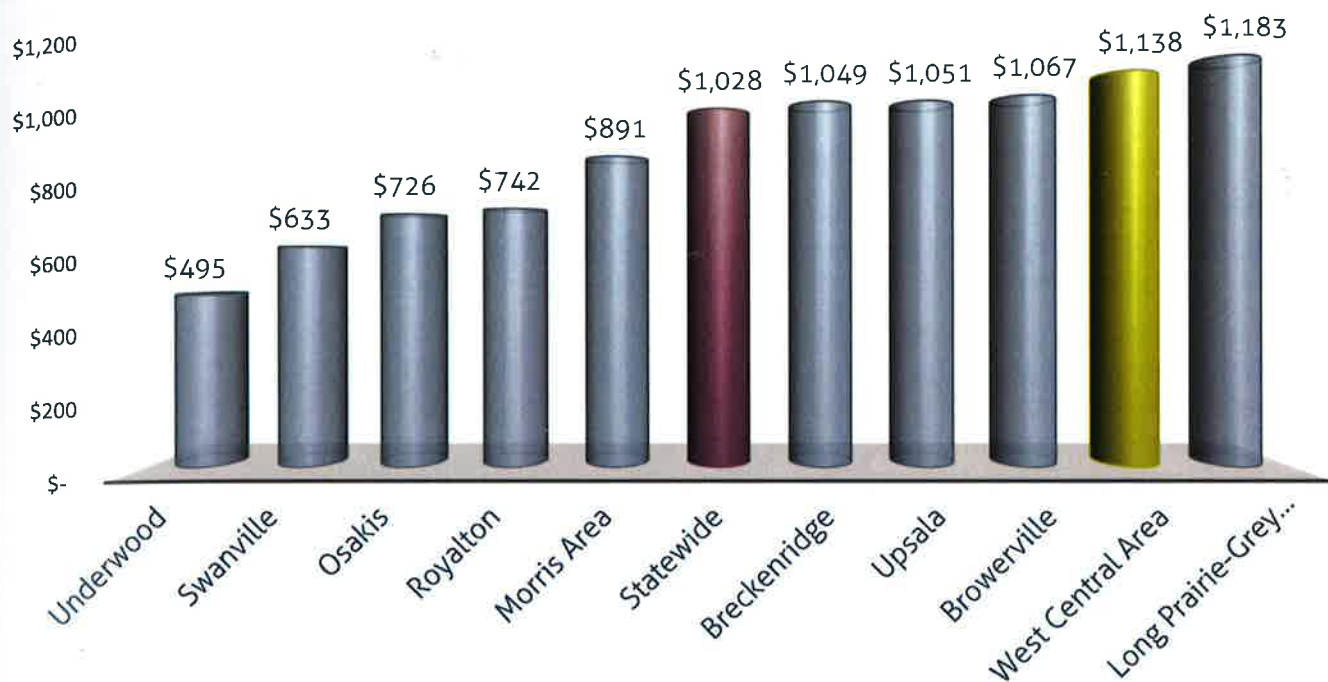


Annual Utility Expense - Breakdown by Type

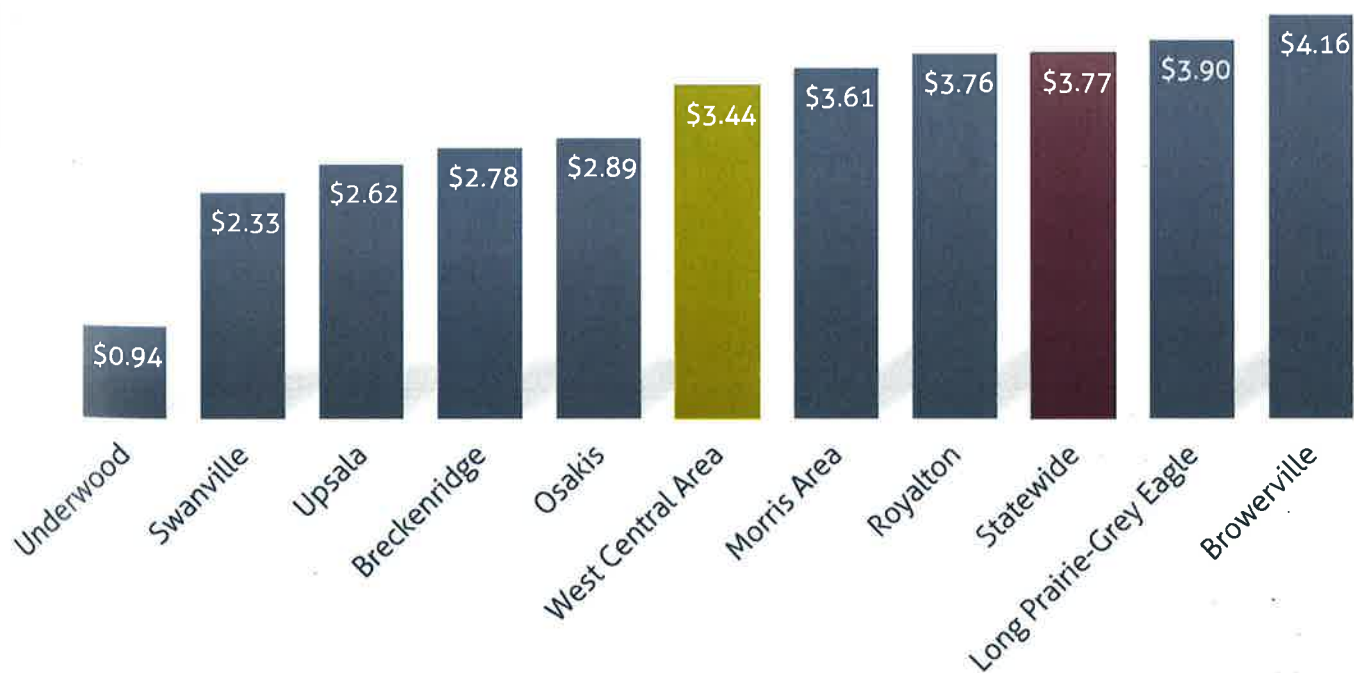


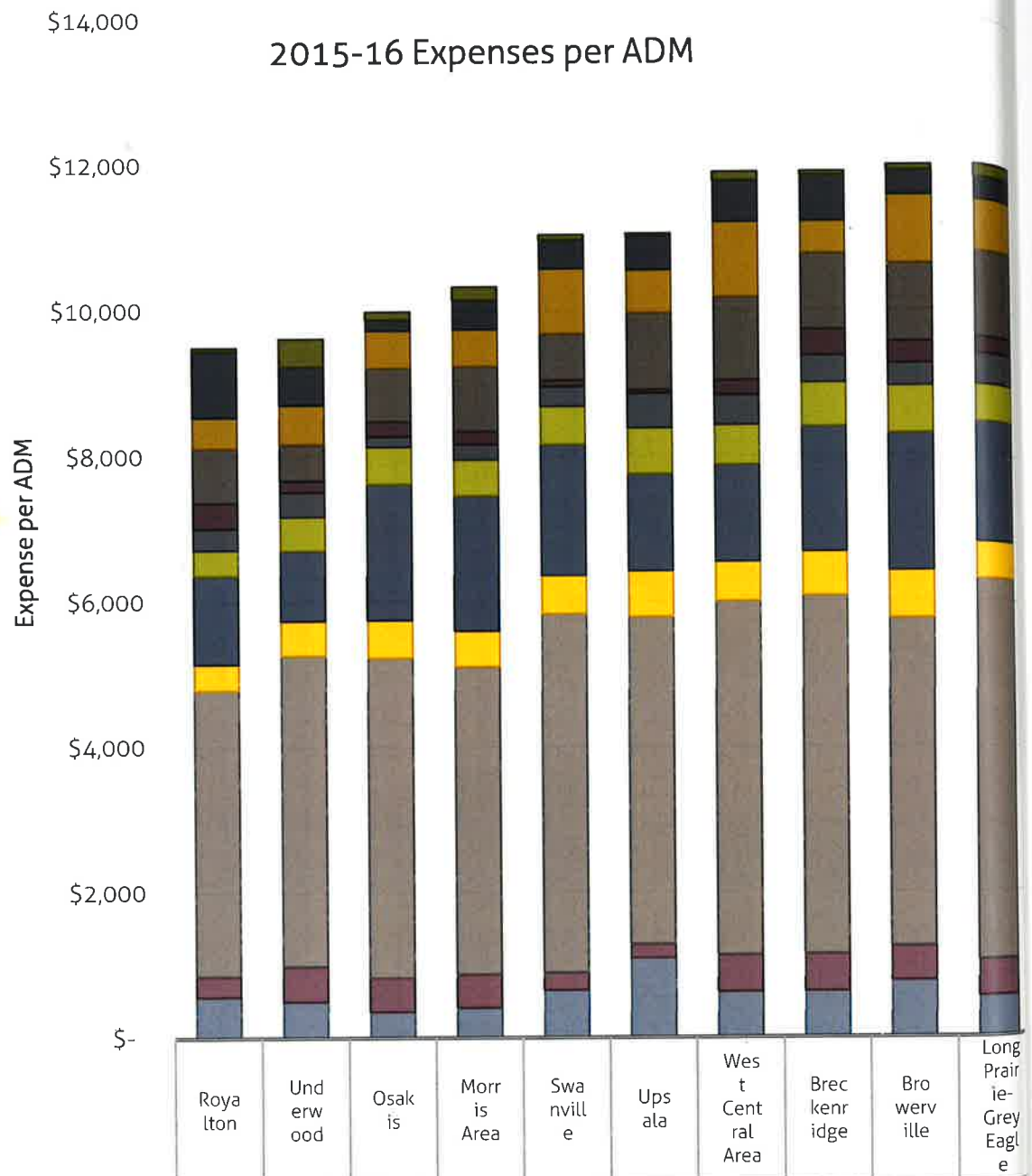
Operating Cost Comparison¹

2015-16 Operation & Maintenance Expense per Student



2015-16 Operation Maintenance per Sq Ft

¹ Source: Minnesota Department of Education



Operational Costs Analysis (to be completed)

Unesco's approach to operations and maintenance savings is to identify "hard dollar expenditure" waste streams and their sources as they relate to operating and maintaining the district facilities. Once Unesco has a clear understanding of where improvements can be made, we can calculate and apply appropriate cost savings remedies. To locate needs and opportunities for improvement, we begin by analyzing the historical costs relating to operations and maintenance and compare the age and conditions of the actual equipment.

Calculating Operations and Maintenance (O&M) Savings

To calculate O & M savings, Unesco first needs to understand where the district is spending money. To do this we work closely with the district's business office to formulate the existing operations and maintenance cost profile relating to the district facilities. This involves reviewing multiple fiscal years of invoices to arrive at an average cost profile.

Based upon the historical General Fund Operation and Maintenance account expenditures, Unesco will conduct an in-depth analysis of various district fund expenditures (general funds) for operating and maintaining the school facilities. The primary focus included auditing the "operations and maintenance" fund accounts. A thorough review of each check and accompanying invoice was audited to analyze the invoice for expenditure type, expenditure amount and, where the work was performed or where the supplies were used. The fiscal year will be totalized to provide an accurate reflection of costs by Facility Improvement Measure.

Productivity Improvements

It is important to note that productivity of the staff will not be analyzed as it relates to maintaining these facilities. It is not our intention or recommendation to reduce full time employee staffing. Considering your district maintenance department is already lean, the benefit of productivity gains is that they allow more to be done with less. Most importantly, maintenance will switch from a "firefighting" approach to a "fire prevention" approach. Preventive maintenance is 30 percent more cost effective than reactive maintenance. As such, by reducing wasted time spent on "crisis maintenance" and by allocating time for preventive maintenance tasks, the department reduces the amount of contracted or outsourced repairs while improving its overall efficiency of the department.

Long
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Eagle
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\$176

\$301

\$710

\$1,183

\$230

\$422

\$505

\$1,660

\$505

\$5,239

\$501

\$561

Summary of Projected 810/811 Fund Savings



Facility	R10 and R11 Savings							Totals
	C	E.1	E.2	MA.1a	MA.1b	MA.2	P	
Educational Service Center	\$ 2,160	\$ 2,614	\$ 1,094	\$ -	\$ -	\$ -	\$ 236	\$ 6,016
Hobbsdale Coopers High School	\$ 132	\$ 12,012	\$ 488	\$ -	\$ -	\$ -	\$ 375	\$ 13,191
Hobbsdale Ausimring High School	\$ 6,032	\$ 21,315	\$ 515	\$ -	\$ -	\$ -	\$ 1,112	\$ 28,965
Plymouth Middle School	\$ 3,044	\$ 13,099	\$ 727	\$ -	\$ -	\$ -	\$ 480	\$ 23,359
Hobbsdale Middle School	\$ -	\$ 1,501	\$ -	\$ -	\$ -	\$ -	\$ 2,246	\$ 3,749
Sandring Learning Center	\$ 2,834	\$ 4,037	\$ 104	\$ -	\$ -	\$ -	\$ 70	\$ 7,995
Forest Elementary	\$ 1,088	\$ 2,191	\$ 194	\$ -	\$ -	\$ -	\$ 1,306	\$ 5,178
Lakeview Elementary	\$ 1,803	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,803
School of Engineering and Arts	\$ 600	\$ 514	\$ -	\$ 2,311	\$ 760	\$ 908	\$ 1,896	\$ 6,798
Fine Arts/Intensive/iplinary Resource School	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Meadow Lake Elementary	\$ 594	\$ 268	\$ -	\$ -	\$ -	\$ -	\$ 316	\$ 1,185
Neill Elementary	\$ 1,509	\$ 1,277	\$ -	\$ -	\$ -	\$ -	\$ 848	\$ 3,633
New Hope Learning Center	\$ 201	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 201
Noble Elementary	\$ 928	\$ 28	\$ -	\$ -	\$ -	\$ -	\$ 450	\$ 1,406
Northport Elementary	\$ 2,062	\$ 2,690	\$ 191	\$ -	\$ -	\$ -	\$ 356	\$ 5,301
Hobbsdale Spanish immersion	\$ 1,013	\$ 0,940	\$ -	\$ -	\$ -	\$ -	\$ 409	\$ 10,161
Stone-lyn Elementary	\$ 1,801	\$ 54	\$ -	\$ -	\$ -	\$ -	\$ 511	\$ 2,888
Transportation / Bus Garage	\$ 750	\$ 750	\$ 122	\$ -	\$ -	\$ -	\$ -	\$ 1,881
Zachary Lane Elementary	\$ 587	\$ 1,957	\$ 816	\$ -	\$ -	\$ -	\$ 190	\$ 3,552
Total Savings	\$ 10,477	\$ 77,764	\$ 5,083	\$ 2,711	\$ 762	\$ 988	\$ 10,304	\$ 154,545

Code	Description
C	Control System Repair / Calibration
E.1	Lighting - Lamps and Ballasts
E.2	Lighting - Exterior
M.1a	Boiler System - Repair
M.1b	Boiler System - Chemical Treatment
M.2	Steam or HW Distrib. Unit Repair
P	Domestic Pkgs. and Sewer System Maintenance

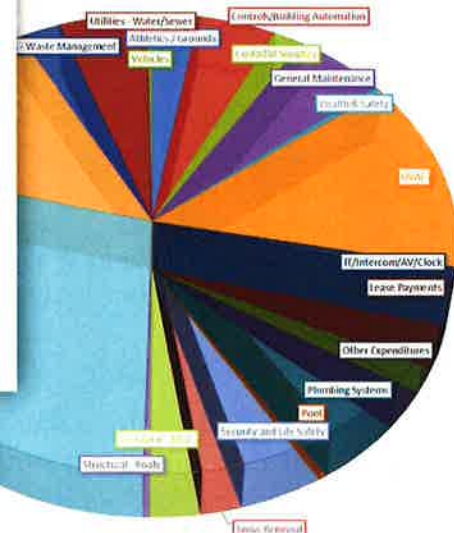
Time-Sun, Inc.
Spartanburg, SC

Page 1 of 1

10/22/2015

Robbinsdale Area Schools

FY 2015 810 and 811 Expenses



10/22/2015

Summary of 810/811 Fund Expenditures

[illegible]

Robbinsdale Area Schools
Summary of 2010 and 2011 Expenditures

[illegible]

Indoor Learning Environment Effects on Student Performance

On any given school day, about twenty percent of Americans spend time in a school building. The average age of our schools is close to fifty years, and studies by the U.S. General Accounting Office have documented widespread physical deficiencies in many of them. Faced with an aging building stock and growing, shifting student enrollments, states and communities are working hard to build and modernize PK-12 facilities.

Those involved in school planning and design see this as an opportunity to enhance academic outcomes by creating better learning environments. Their logic is compelling—how can we expect students to perform at high levels in school buildings that are substandard?

We all know that clean, quiet, safe, comfortable, and healthy environments are an important component of successful teaching and learning. However, which facility attributes affect academic outcomes the most and in what manner and degree?

Nearly 90 percent of school leaders see a **direct link** between quality of school facilities and **student performance**

School Planning and Management (2011)

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School HVAC

High Performance School Characteristics

By Charles Eley, FAIA, P.E., Member ASHRAE

To those of us in the design and construction industry, a high performance school is synonymous with a sustainable school building. However, talk to educators, and they see a high performance school as a school where students excel in their studies. The physical facility and educational outcomes, such as teacher productivity and test scores, certainly are linked. So in a sense, the design professional and the educator have the same goals—they just see them from a different vantage point.

To facilitate and promote positive educational outcomes, a high performance school building provides a comfortable and healthy environment for teachers and students. The building itself cannot guarantee academic performance, but it can help if the school building helps education teach and students learn better. Then it is a high performance school. The

ask is how much do high performance schools cost? Because school districts usually are hampered by constraints on capital work, construction cost increases can mean that they are forced to build fewer classrooms for this and other reasons. The long-term life-cycle cost usually is not considered by school districts. If it were, the discounted value of future energy and water savings from high performance schools would exceed any initial cost increases.

G. Kutz, et al., in a recent study for the Massachusetts Technology Collaborative, "pragmatic costs for high performance schools at 0.15 to 0.25 of construction cost (excluding site acquisition). Another study" by 12 education considered

whether at right details what the Collaborative for High Performance Schools (CHPS) (www.chps.net) considers the important characteristics of a high performance school building.

Costs and Benefits

The first question asked those members and school facility management personnel

About the Author

Charles Eley, FAIA, P.E., is a vice president of Mechanical Energy Conservation and Efficiency Inc. a national director of the Collaborative for High Performance Schools (CHPS) and a member of the CHPS San Francisco Manual and Advanced Lighting Guidelines Task Group and Standard 90.1-2004 Green Manual and Standard 90.1-2004 Green Manual.

80 ASHRAE Journal www.ashrae.org May 2008

...educators see a **high-performance school** as a school where students excel in their studies. The **physical facility** and **educational outcomes**, such as teacher productivity

Indoor Air Quality

There is a growing body of work linking educational achievement and student performance to the quality of air they breathe in schools.

Poor indoor air quality (IAQ) is widespread, and its effects are too important to ignore. The U.S. General Accounting Office has found that fifteen thousand schools suffer from poor IAQ, affecting more than eight

Children are especially at risk - six times more vulnerable to indoor air pollutants than adults

Engineered Systems (1998)

million children or one in five children in America's schools (General

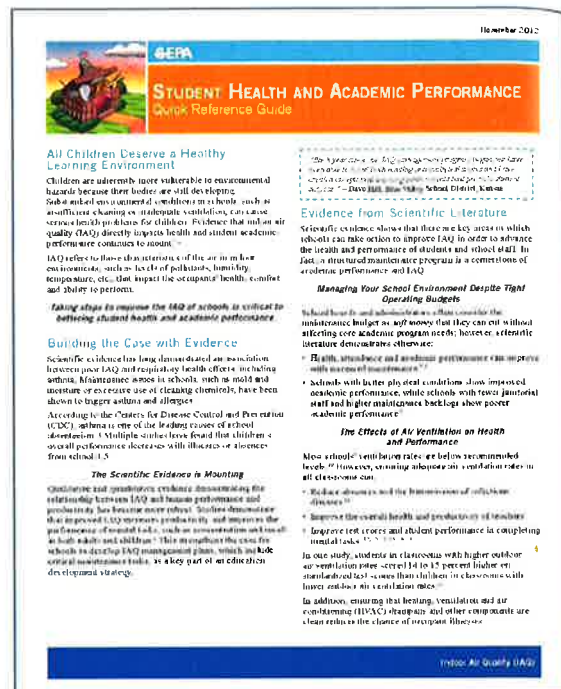
Accounting Office 1995). The IAQ symptoms identified—irritated eyes, nose and throat, upper respiratory infections, nausea, dizziness, headaches and fatigue, or sleepiness—have collectively been referred to as “sick building syndrome” (EPA 2000).

Ironically, the high incidence of symptoms stemming from poor IAQ seems to have emerged as an unintended consequence of the electric power brownouts, oil embargoes, and gas lines that characterized the 1970s-energy crisis. In response to that national emergency, many buildings, including schools, were fitted with air handling systems and controls that delivered less fresh air than now is considered adequate. Most recommendations

Indoor levels of air pollutants can be two to five times higher, and occasionally 100 times higher, than outdoor levels. In 1999, the National Center for Education Statistics of the U.S. Department of Education reported that approximately 25 percent of public schools described unsatisfactory ventilation, while 20 percent of schools told of unsatisfactory IAQ.

IAQ problems can cause discomfort and contribute to short- and long-term health problems for students and staff.

Environmental Protection Agency (EPA) (2011)



from the Occupational Safety and Health Administration (OSHA) and the National Institute of Occupational Safety and Health (NIOSH) now call for between **fifteen and twenty cubic feet of air per minute per person**. These enhanced ventilation rates not only deliver more adequate supplies of fresh air but also help dilute or remove contaminants, especially chemical (e.g., formaldehyde, toluene, and styrene) and biological (e.g., mold and bacteria) contaminants that have highly demonstrable negative health effects.

Most discussions linking IAQ to student performance depend on a series of simple logical links: poor indoor air quality makes teachers and students sick—and sick students and teachers can't perform as well as healthy ones (EPA 2000, Kennedy 2001, Leach 1997). This logic seems unassailable, and researchers are developing the scientific evidence to support it.

Most notably, poor IAQ has been associated with increased student absenteeism. For example, Smedje and Norback (1999) found a positive relationship between airborne bacteria and mold and asthma in children, which in turn increased absentee rates (also Rosen and Richardson 1999, EPA 2000). Further, the American Lung Association (ALA) found that American children miss more than ten million school days each year because of asthma exacerbated by poor IAQ (ALA 2002, EPA 2000).

Rosen and Richardson (1999) found that improving air quality through electrostatic air cleaning technology reduces absenteeism. Their experiment, conducted in two Swedish day-care centers, one old and the other modern, collected data on absenteeism and air quality over three years. The air cleaning technology was operational during only the second of the three test years, and absenteeism fell during that period in both schools. Only in the older school did the change reach statistical significance (absenteeism dropped from 8.31 percent in year one to 3.75 percent in year two, but upon removing the air cleaners, the rate increased to 7.94 percent in year three).

Impact of Carbon Dioxide on Human Decision Making Performance

Until now, research used CO₂ measurements as a rough indicator of overall ventilation in buildings. Low ventilation rates allow concentrations of many pollutants, including CO₂, to build up, which experts have blamed for illnesses. New research, however, suggests that even carbon dioxide itself may be causing problems.

Along with three colleagues at the Berkeley Lab, William Fisk partnered with researchers at the State University of New York who had developed a computer-based test to measure decision-making.

In the experiment they conducted, the scientists had 22 participants take three versions of the test in two-and-a-half-hour sessions, each time with a different carbon dioxide level in the room.

The results floored Fisk. At concentrations as low as 1,000 parts per million (ppm), decision-making declined moderately, but noticeably, on most measures. At 2,500 ppm, decision-making was substantially hampered.

"I was very surprised at the strength of the effect," Fisk said. "These results were so contrary to the widespread view."

He also worried about the implications of the findings. Carbon dioxide levels studied match those

Studies demonstrate that improved IAQ increases productivity and **improves the performance of mental tasks**, such as improved concentration and recall in both adults and children.

Controlled studies show that students perform school work faster as ventilation rates increase. The performance of teachers and staff also improves with higher ventilation rates.

Environmental Protection Agency (EPA) (2011)



ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY

Is CO₂ an Indoor Pollutant? Higher Levels of CO₂ May Diminish Decision Making Performance

William J. Fisk¹, Usha Satish,² Mark J. Mendell,¹
Toshifumi Hotchi,¹ Douglas Sullivan,¹

¹Indoor Environment Group
Lawrence Berkeley National Laboratory
Berkeley, CA

²State University of New York
Upstate Medical University
Syracuse, NY

March 2013

Funding to Lawrence Berkeley National Laboratory was from the State University of New York Upstate Medical University via contract 600305000 and by the Assistant Secretary for Energy Efficiency and Renewable Energy, Building Technologies Program of the U.S. Department of Energy under contract DE-AC02-05CH11231. Funding to the State University of New York was provided by Collaborative Activities for Research and Technology Innovation (CARTI), which supports research in the areas of air quality and water resource management. CARTI, part of the Syracuse Center of Excellence located in Syracuse, New York, is supported by the U.S. Environmental Protection Agency under award EM-83340401-0.

found in some crowded conference rooms, cars, and planes. Surgeons wearing masks probably inhale much more. Concentrations in public school classrooms frequently exceed 1,000 ppm and sometimes even 3,000 ppm.

"If you're taking your SATs and happen to be stuck in a room that's poorly ventilated, your performance could be adversely affected. Is that fair?" Fisk asked.

The team's results, published in 2012 in *Environmental Health Perspectives*, were statistically significant, but they were cautious, noting that "confirmation of these findings is needed." That confirmation came in 2015, when a team led by Harvard public health researchers published another study in the journal, using the same test. They found that participants performed only half as well under indoor carbon-dioxide concentrations of 1,400 ppm as they did in a well-ventilated room.

Impaired Decision-Making

On nine scales of decision-making performance, participants in the Berkeley study showed significant reductions on six scales at CO₂ levels of 1,000 ppm and large reductions on seven at 2,500 ppm. The most dramatic declines in performance, in which subjects were rated as "dysfunctional," were for taking initiative and thinking strategically.

"We found astonishing, unbelievable effects with CO₂ levels that were not that high," Mendell says. "Our study suggested that even at 1,000 ppm there were some adverse effects on decision-making, and 2,500 produced 'dysfunctional' performance."

Data from elementary school classrooms has found CO₂ concentrations frequently near or above the levels in the Berkeley Lab study. Although their study tested only decision making and not learning, Fisk and Mendell say it is possible that students could be disadvantaged in poorly ventilated classrooms, or in rooms in which a large number of people are gathered to take a test. "We cannot rule out impacts on learning," their report says.

Illnesses apparently related to tight, energy-efficient new buildings received increasing attention beginning in the 1970s, with the emergence of "sick building syndrome," a cluster of symptoms that include headaches, respiratory

Participants performed only half as well under indoor carbon-dioxide concentrations of 1,400 ppm as they did in a well-ventilated room.



<http://www.ehponline.org>

ENVIRONMENTAL HEALTH PERSPECTIVES

Associations of Cognitive Function Scores with Carbon Dioxide, Ventilation, and Volatile Organic Compound Exposures in Office Workers: A Controlled Exposure Study of Green and Conventional Office Environments

Joseph G. Allen, Piers MacNaughton, Usha Satish, Suresh Santanam, Jose Vallarino, and John D. Spengler

<http://dx.doi.org/10.1289/ehp.1510037>

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National Institute of
Environmental Health Sciences

symptoms and difficulty concentrating. Experts identified indoor air pollutants as the likely source, but they didn't suspect that carbon dioxide was part of the problem.

Cognition and Pollutants

The Harvard study, which also involved researchers from SUNY Upstate Medical Center and Syracuse University, used similar testing methods as the Berkeley study, but it monitored participants over a longer period. It confirmed the 2012 results.

On average, cognitive scores were 61 percent higher on days with low concentrations of pollutants, compared with the same participants' scores when they spent time in a low-ventilation environment with elevated levels of pollutants, and 101 percent better on days with the most ventilation. In fact, participants scored highest in eight of nine test areas on the days with the greatest ventilation.

For seven of the nine areas of productive decision-making, the average scores decreased as the level of carbon dioxide grew higher. Compared with the two days of high ventilation, cognitive function scores were 15 percent lower on the day with moderate CO₂, about 945 ppm, and 50 percent lower on the day with CO₂ concentrations around 1,400 ppm.

Data from elementary school classrooms has found CO₂ concentrations frequently near or above the levels in the Berkeley Lab study. Although their study tested only decision making and not learning, Fisk and Mendell say it is possible that students could be disadvantaged in poorly ventilated classrooms, or in rooms in which a large number of people are gathered to take a test. "We cannot rule out impacts on learning," their report says.

Ventilation Costs vs. Increased Productivity

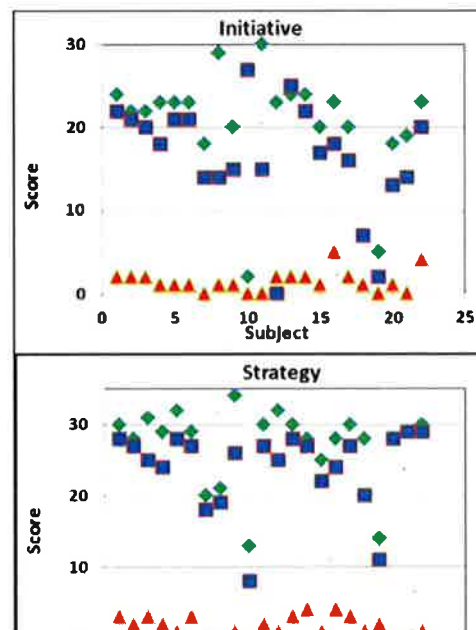
Worrisome, to be sure — but probably fixable. "There are things we can do, right now, to enhance indoor environmental quality and benefit human health, well-being and productivity," Allen says. "This research has reinvigorated discussions with industry professionals on creating healthy indoor environments. People want buildings that make them healthy."

The most obvious solution is to increase ventilation from the outside. A recent paper by Allen and colleagues suggests that spending money to increase ventilation in office buildings would be very cost-effective for employers, estimating the cost of doubling indoor ventilation rates at \$40 per person annually, against a productivity gain of \$6,500 per person per year.

"The increased use of energy may be worthwhile, if it turns out to have important benefits for people in the workplace or the classroom, allowing them to think or perform better," Mendell says.

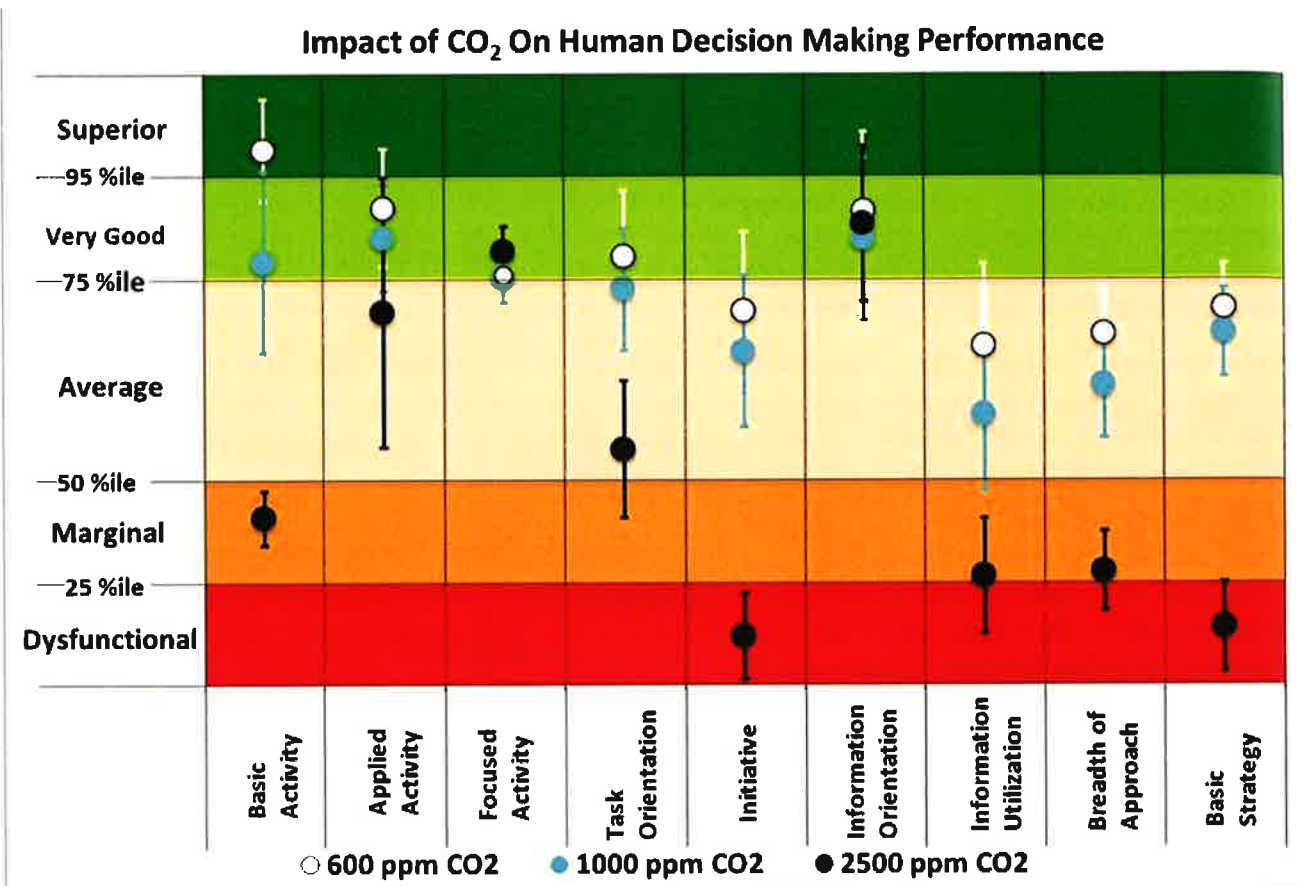
"If you're taking your SATs and happen to be stuck in a room that's poorly ventilated, your performance could be adversely affected. Is that fair?"

It is possible that students could be disadvantaged in poorly ventilated classrooms



Berkeley Lab researchers found that even moderately elevated levels of indoor carbon dioxide resulted in lower scores on six of nine scales of human decision-making performance.

Berkeley Lab researchers found that even moderately elevated levels of indoor carbon dioxide resulted in lower scores on six of nine scales of human decision-making performance.²



"We found astonishing, unbelievable effects with CO₂ levels that were not that high. Our study suggested that at 1,000 ppm there were adverse effects on decision-making, and 2,500 produced 'dysfunctional' performance."

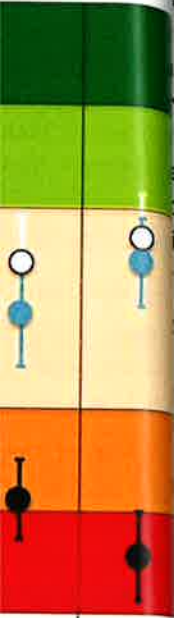
Mark J. Mendell

Indoor Environment Group Lawrence Berkeley National Laboratory Berkeley, CA (2013)

² "Is CO₂ an Indoor Pollutant? Higher Levels of CO₂ May Diminish Decision Making Performance"; William J. Fisk, Usha Satish, Mark J. Mendell, Toshifumi Hotchi, Douglas Sullivan; Indoor Environment Group Lawrence Berkeley National Laboratory Berkeley, CA; March 2013

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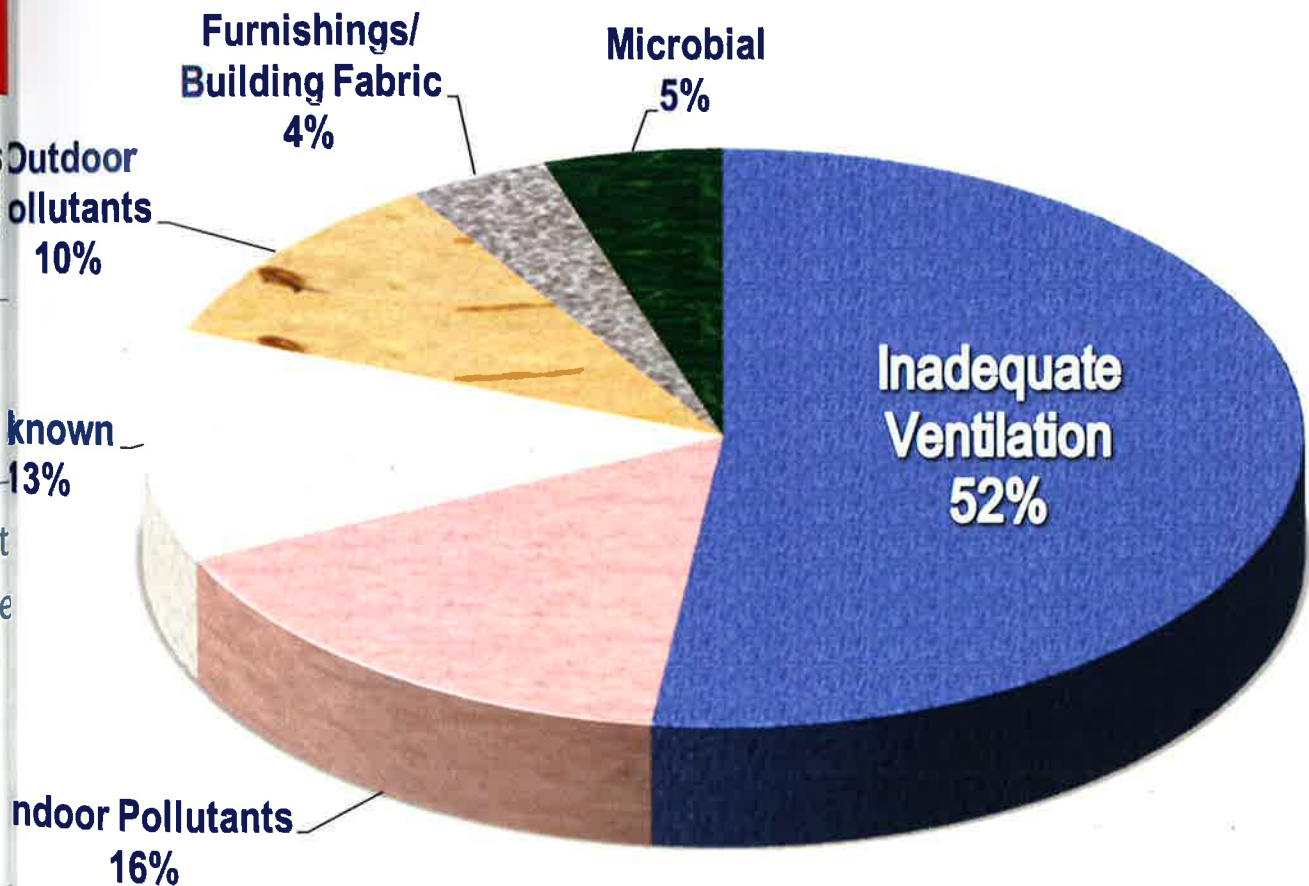
. Fisk, Usha Satis
al Laboratory

Ventilation Effects on Performance

seems obvious that in a sealed space, without the availability of fresh air from outside, the occupants of that space will die from asphyxiation. Yet despite this knowledge, thousands of workers in confined spaces constitute a recurring occupational tragedy (NIOSH 1986). While we certainly seek to avoid such extreme conditions in schools, a surprising number of classrooms lack adequate ventilation, and evidence is accumulating to support the common-sense notion that occupants of a classroom without good ventilation cannot function normally and cannot learn at their capacity.

The purpose of ventilating classrooms and school buildings, at minimum, is to remove or otherwise dilute contaminants that can build up inside. Such contaminants come from people breathing, from their skin, clothes, perfumes, soaps, deodorants, from building materials and cleaning agents, pathogens, and from a host of other agents that, at sufficient concentrations, are harmful.

Source of Indoor Air Quality Problems



Students in classrooms with higher outdoor air ventilation rates scored **14 to 15 percent higher on standardized test scores** than children in classrooms with lower outdoor air ventilation rates.

Shaughnessy, R.J., et al. 2006

Higher ventilation rates reduce the transmission and spread of infectious agents in buildings. This is the conclusion of a multidisciplinary expert panel after reviewing 40 studies conducted between 1960 and 2005.

Environmental Protection Agency (EPA) (2011)

be the unwitting architects of learning spaces that impair learning and health by offering inadequate ventilation—whether this results from economic measures, ignorance, neglect, poor maintenance, or some combination of these factors.

One of the first symptoms of poor ventilation in a building is a buildup of carbon dioxide caused by human respiration. When carbon dioxide levels reach 1,000 parts per million (about three times what is normally found in the atmosphere), headaches, drowsiness, and the inability to concentrate ensue. Myhrvold et al. (1996) found that increased carbon dioxide levels in classrooms owing to poor ventilation decreased student performance on concentration tests and increased students' complaints of health problems as compared to classes with lower carbon dioxide levels. The study was conducted at eight different European schools on more than 800 students with results that achieved statistical significance.

Despite the clear need for fresh air in schools, the systems that are the principal source of ventilation other than windows don't always deliver adequate supplies of fresh air. These include not just the ducted systems influenced by the 1970s-

Asthma is the principal cause of school absences, accounting for 20% of lost school days in elementary and high schools.

Boyer, Crow, and Fischer (1999)

debris at ground level, for example, which can result in an accumulation of mold, bacteria, and other contaminants (Crawford 1998). These unit ventilators, beyond creating excessive, sustained background noise that can hinder learning, also tend to filter out less air pollution than more modern ventilation systems, which can lead to higher levels of volatile organic compounds (VOC) in the air (Strickland 2001, 364).

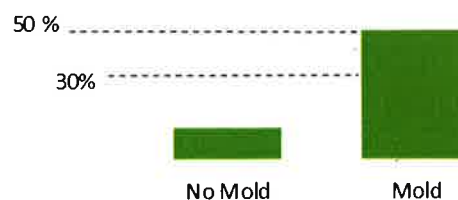
Schools need especially good ventilation because children breathe a greater volume of air in proportion to their body weight than adults do (Kennedy 2001, McGovern 1998, Moore 1998) and because schools have much less floor space per person than found in most office buildings (Crawford 1998). But because of the high costs of conditioning the ventilation air in schools to comfortable temperatures before it is circulated, the designers and operators of school buildings can

Failure to prevent indoor air problems, or failure to act promptly, can have consequences such as: increasing the chances for long-term and short-term health problems for students and staff; impacting the student learning environment, comfort and attendance; reducing productivity of teachers and staff due to discomfort, sickness, or absenteeism; etc.

Environmental Protection Agency (1996)

energy crisis, which often delivered only about one third of the fresh air supplies now deemed adequate (ASHRAE 1989), but a whole variety of ventilation systems with their own unique problems. For example, the through-wall unit ventilators specified in school designs for decades, which connect directly through the wall to an outside air source and are fitted with a fan to draw outside air into the classroom (Strickland 2001), often become shelves for books and other classroom materials, which in turn restricts fresh air flow. The intake vents in these systems, through poor design or neglect, can restrict airflow or can have their flows restricted by snow or

Asthma Related Health Effects



Inadequate ventilation is often a cause of IAQ problems. A 1989 study by the National Institute for Occupational Safety and Health found that more than half of the IAQ problems in the workplace were caused by inadequate ventilation (NIOSH 1989). A 1992 study by Armstrong Laboratory found that the two greatest causes of poor IAQ were inadequate maintenance of heating, ventilation, and air conditioning (HVAC) systems and a lack of fresh air. A 1998 Cornell

Respiratory health effects, such as infections and asthma, are most closely associated with increased absenteeism. In 2003, children with at least one asthma attack in the previous year missed an estimated 12.8 million school days due to asthma.

Children's overall performance decreases with illnesses or absences from school.

Student performance also can be affected when teachers are absent due to illness. Even the best substitute teachers may disrupt the learning process, and they can present an added expense.

Environmental Protection Agency (EPA) (2011)

University study found that workers in poorly ventilated offices are twice as likely to report the symptoms of sick building syndrome as employees in well-ventilated environments. The study also found that a relatively small buildup of carbon dioxide from human respiration—an indicator of poor ventilation—is also related to sick building syndrome (Lang 1998).

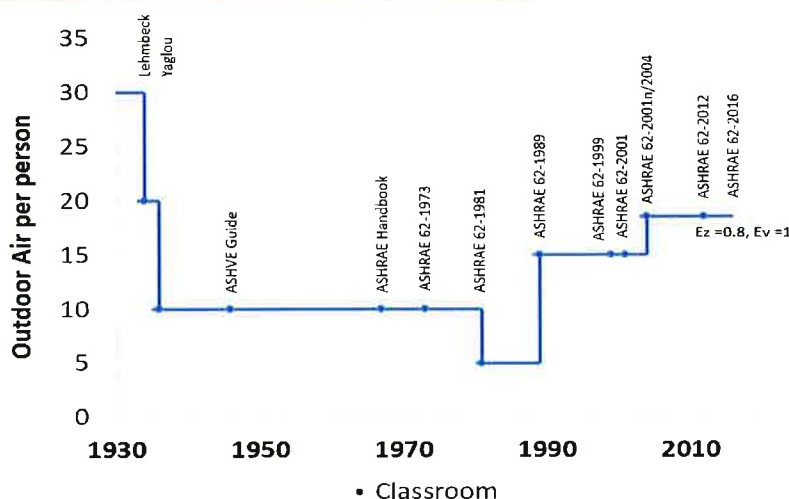
Twenty-six percent of Chicago public school teachers and more than thirty percent of Washington, D.C., teachers interviewed reported health-related problems caused by the school facility. Most of these problems were related to poor indoor air quality, with teachers reporting that asthma and other respiratory problems were the main adverse health effect (Schneider 2002).

Wargocki et al. found that ventilation levels in offices affected performance in logical reasoning, typing, and arithmetic (EPA 2000). The researchers also found that higher carbon dioxide levels increased the incidence of headaches, which appeared "to affect

human performance during office work by reducing the inclination to exert effort" (Wargocki et al. 1999, 136). Can we assume that this relationship might extend to students? Perhaps even more so because they are growing, developing, and attempting to learn new things.

Smedje and Norback (1999) in a 1993 survey found that students with asthmatic symptoms were less likely to report those two years later if the school they attended had installed a new ventilation system in the meantime. Given that asthma is among the leading causes of absenteeism in American schools, we can assume that improved ventilation can bring about less asthma, better school attendance, and improved academic performance.

Increasing Standards for Outdoor Air Ventilation



Minnesota K-12 Ventilation Considerations

1997 Omnibus Education Act

The 1997 Omnibus Education Act required school districts to develop and implement Indoor Air Quality (IAQ) Management Plans and to monitor and improve indoor air. Per the Act, the Minnesota Department of Education (MDE) has established guidelines for indoor air quality management in public schools, including guidelines for ventilation and indoor air quality.

These statutory changes came about because of calls by parents, employees, and citizens to improve the quality of air in schools.

Ventilation Systems Must

- Ensure adequate **clean** outdoor air: 15 cfm/person in classrooms, 20 cfm/person in offices.
- Be free of mold and other contaminants in the air handler, ductwork, and insulation.
- Provide a comfortable space (temperature, humidity, air movement, and odors).
- Provide even air and temperature distribution to the space.
- Have appropriate filtering to remove dust, pollens, and other particulates.

Minnesota Department of Education Policy Letter

In July of 2003, the Minnesota Department of Education issued a Policy Letter stating that each Minnesota school district must: (a) measure the ventilation rates of each occupied space, and (b) develop a plan to remedy any areas found deficient. The policy letter went on to state that this initiative need to be completed by June 30, 2006. However, with the lack of state funding for Health and Safety initiatives an updated policy letter has now temporarily removed the previously established deadline. It is expected that a new deadline will be established in the future. Now, Unesco continues to work with school districts across Minnesota performing ventilation assessment in conjunction with the comprehensive energy and facility analysis, allowing these districts to comply with all State ventilation-testing requirements.



Raising classroom outdoor air ventilation rates can **reduce absenteeism by approximately five to 10 absences per 1,000 students** for a 1,000 parts per million, or ppm, decrease in the difference between indoor and outdoor carbon dioxide (CO₂) levels

Environmental Protection Agency (EPA) (2011)

Indoor Air Quality Management

The Minnesota planning model for schools to follow for proper Indoor Air Quality management is as follows:

- **IAQ Coordinator** - An IAQ coordinator should be appointed to manage the IAQ program, should be an employee.
- **IAQ Assessment** - An IAQ assessment of all facilities should be performed to identify and document problem areas.
- **Development of Goals** - Based on the results of the IAQ assessment, each district should develop goals which must be achieved for the implementation of an effective IAQ program.
- **Public School Board/Administrative Support for Stated Goals** - Administrative support from the highest level of the organization and a written commitment from the school board, superintendent, and other key personnel to the goals is necessary for an effective IAQ program.
- **Funding** - Adequate budgets are necessary for IAQ staff to meet the stated goals. The amounts of funding will vary based on the scope of each public school district's program.
- **Staff** - An IAQ support team should be developed as necessary to achieve the district's goals. The team may include administrators, health officials, custodians and maintenance personnel, energy manager, design and construction staff, teachers, parents, students and others.
- **IAQ Management Plan** - A written IAQ management plan should be developed and maintained. The plan should include the following:
 - ◇ **Training** - Education and training of the IAQ coordinator and support team, teachers, staff and students on the recognition, prevention and resolution of IAQ problems.
 - ◇ **Communication** - A procedure for communicating with students, parents, faculty and staff regarding IAQ issues.
 - ◇ **Complaint Response** - A written procedure for documenting and responding to IAQ complaints and problems.
 - ◇ **Record Keeping** - An IAQ complaint collection, resolution and records retention program.
 - ◇ **Maintenance and Operation Plan** - A written building maintenance and operation plan containing: a written description of the building systems and building functions and occupancy, schematics and/or as-built drawings with equipment locations and performance criteria, outside air requirements, sequences of operation, daily building and system operation schedules, test and balance reports, maintenance schedules, building inspection checklists and maintenance equipment checklists.
 - ◇ **Implementation Schedule** - A schedule to implement the management plan.
 - ◇ **Annual Review** - Annual IAQ inspection/review of facilities including a walk through by the IAQ coordinator or designee.
 - ◇ **School Board Review** - A review of the IAQ program status and future needs should be presented annually to the School Board by the IAQ coordinator.



SEPA
United States
Environmental Protection
Agency

Indoor Environment Division
Office of Healthy and
Sustainable Buildings
Room 3B
August 2009



Indoor Air Quality and Student Performance

The Problem

Recent data suggest that poor IAQ can reduce a person's ability to perform specific mental tasks requiring concentration, calculation, or memory.

The Cause

Air in most indoor environments contains a variety of particles and gaseous contaminants. These contaminants are commonly referred to as indoor pollutants when they affect human health and performance. Indoor temperature and relative humidity can also affect health and performance directly, and can affect human performance indirectly by influencing the airborne level of molds and bacteria.

Most often, poor indoor air quality results from the failure to follow practices that help create and maintain a healthy indoor environment. Common examples include failure to:

- Control pollution sources such as art supplies and laboratory activities
- Control temperature and humidity
- Control moisture and clean up spills
- Ventilate each classroom adequately
- Adequately perform housekeeping and maintenance operations
- Use integrated pest management to minimize the use of pesticides

Failure to deal adequately with any of these issues may go unnoticed, but can and often does take its toll on health, comfort, and performance.

The Consequences

Recent data suggest that poor IAQ can reduce a person's ability to perform specific mental tasks requiring concentration, calculation or memory.

How Does Indoor Air Quality Affect A Child's Ability To Learn?

Poor indoor air quality (IAQ) can cause illness requiring absence from school, and can cause acute health symptoms that decrease performance while at school. In addition, recent data suggest that poor IAQ can reduce a person's ability to perform specific mental tasks requiring concentration, calculation, or memory.

Specific Studies

Schools should be designed, built and maintained in ways to minimize and control sources of pollution, provide adequate exhaust and outdoor air ventilation by natural and mechanical means, maintain proper temperature and humidity conditions, and be responsive to students and staff with particular sensitivities, such as persons with allergies or asthma. Adverse consequences can easily result when IAQ problems are not addressed properly.

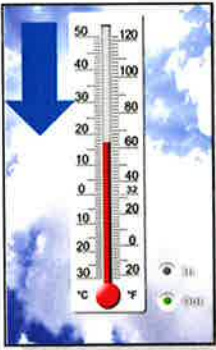
Effects from Building-Related Illnesses

Children do not perform as well when they are sick or absent from school. Indoor air quality problems can result in absence because of respiratory infections, allergic diseases from biological contaminants, or irritant reactions to chemicals used in virtually every part of the school. Some conditions in the school environment are closely associated with the incidence of sick building syndrome and asthma symptoms^{1,2}, and asthma-related illness is one of the leading causes of school absenteeism, accounting for over 10 million missed school days per year³. In addition, persons with asthma or other sensitivities may

Indoor Air Quality in schools is an issue that reaches into every classroom in Minnesota. Proper operation and enforcement of each district's Indoor Air Quality Management Plan relies on the vigilance and collaboration of administration, staff, and parents (as well as objective facility management resource providers).

Temperature and Humidity

Temperature and humidity affect IAQ in many ways, most significantly because their levels can promote or inhibit the presence of bacteria and mold. For example, a study of Florida classrooms with relative humidity levels greater than seventy-two percent found visible mold growth on the ceilings and complaints of allergy symptoms associated with sick building syndrome (Bates 1996). At the other end



There is also evidence that modest changes in room temperature (e.g., 77°F to 68°F) affect children's abilities to perform mental tasks requiring concentration, such as addition, multiplication, and sentence comprehension. **Overall, cooler temperatures and modest relative humidity conditions have the most positive impact.**

Environmental Protection Agency (EPA) (2011)

of the humidity scale, Leach (1997) reported findings of a 1970 study done in Saskatoon, Saskatchewan, Canada, which found absenteeism was reduced in schools by twenty percent as relative humidity in the facilities was increased from twenty-two to thirty-five percent. Wyon (1991) showed that student performance at mental tasks is affected by changes in temperature, and Fang et al. (1998) found that office workers are most comfortable in the low end of temperature and humidity comfort zones. These findings support the idea that students will perform mental tasks best in rooms kept at moderate humidity levels (forty to seventy percent) and moderate temperatures in the range of sixty-eight to seventy-four degrees Fahrenheit (Harner 1974, Wyon, Andersen, and Lundqvist 1979).

Researchers have been studying the temperature range associated with better learning for several decades. Harner (1974) found that the best temperature range for learning reading and math is sixty-eight to seventy-four degrees Fahrenheit and that the **ability to learn these subjects is adversely affected by temperatures above seventy-four degrees Fahrenheit**. As temperature and humidity increase, students report greater discomfort, and their achievement and task-performance deteriorate as attention spans decrease (King and Marans 1979).

Building renovations in one district led teachers to feel "a renewed sense of hope, of commitment, a belief that the district cared about what went on that building."

US Department of Education (1998)

Research also shows that even within commonly acceptable temperature spans, there are specific ranges that increase individual performance. It is not feasible, however, to provide every student in a common space with the temperature or humidity that best suits him or her.

Thermal factors may seriously degrade teachers' abilities to teach and may affect their morale. In the 2002 follow-up study to the school daylighting study completed in 1999 by the Hescong Mahone Group, environmental control was found to be an important issue for teachers, especially for those who lacked full environmental control:

Teachers seemed to hold a basic expectation that they would be able to control light levels, sun penetration, acoustic conditions, temperature, and ventilation in their classrooms. They made passionate comments about the need for improvement if one or more of the environmental conditions could not be controlled in their classrooms (Hescong 2002).

Lowe (1990) found that the best teachers in the country emphasized their ability to control classroom temperature as central to the performance of teachers and students. Lackney (1999) showed that teachers believe thermal comfort affects both teaching quality and student achievement. Corcoran et al. (1988) focused on how school facilities' physical conditions affect teacher morale and effectiveness. They conclude that problems caused by working conditions may result in higher absenteeism, reduced effort, lower effectiveness in the classroom, low morale, and reduced job satisfaction.

Classroom lighting plays a particularly critical role in student performance (Phillips 1997). Obviously, students cannot study unless lighting is adequate, and there have been many studies reporting optimal lighting levels (see Mayron et al. 1974, Dunn et al. 1985, 866). Jago and Tanner's review (1999) cites results of seventeen studies from the mid-1930s to 1997. The consensus of these studies is that appropriate lighting improves test scores, reduces off-task behavior, and plays a significant role in students' achievement.

Recently there has been renewed interest in increasing natural daylight in school buildings. Until the 1950s, natural light was the predominant means of illuminating most school spaces, but as electric power costs declined, so too did the amount of daylighting used in schools. According to Benya, a lighting designer and consultant, recent changes, including energy-efficient windows and skylights and a renewed recognition of the positive psychological and physiological effects of daylighting, have heightened interest in increasing natural daylight in schools (Benya 2001). Lemasters' (1997) synthesis of fifty-three studies pertaining to school facilities, student achievement, and student behavior reports that daylight fosters higher student achievement. The study by the Heschong Mahone Group (1999), covering more than 2000 classrooms in three school districts, is perhaps the most cited evidence about the effects of daylight. The study indicated that students with the most classroom daylight progressed twenty percent faster in one year on math tests and twenty-six percent faster on reading tests than those students who learned in environments that received the least amount of natural light (also Plympton, Conway, and Epstein 2000). There were some questions that could not be answered by the original Heschong study, such as whether the higher performance was driven at least in part by better teachers being assigned to the classrooms that received more daylight. A follow-up study surveyed teachers in one of the districts and added information on teacher characteristics to the analysis. This new report found that the effect of daylighting remained both positive and significant. Other studies are currently in process to try to validate the results in another school district and determine more detail about a possible mechanism for such an effect.

There also have been studies attempting to correlate elements such as color and aesthetic appeal with student achievement. One example is Cash's report (1993) that student achievement improved when walls were painted pastel colors instead of white. The appeal of physical conditions such as color may vary considerably among individuals, and there is a good opportunity here for further work with definitive recommendations.

Optimized Lighting Conditions Help Students Improve Performance

- Students working under artificial LED lighting designed to simulate daylight showed improved concentration and classroom performance.
- "Biologically-optimized" lighting is produced by combining blue and white LEDs. It provides stimulation to the body as if the person were outdoors and shifts the circadian rhythm forward so students are alert earlier in the day.

- Students working under biologically-optimized lighting achieve better results in concentration ability and increased performance speed.



Even though it has been recognized for a long time that light with a specific color temperature and illumination intensity has a positive effect on people's performance and well-being, the fact that the students with the biologically-optimized lighting had up to a third fewer errors in the concentration test is impressive."

- Katrin Hille, ZNL Head of Research



My concentration is actually better [in biologically-optimized lighting]...in normal lighting, however, I sometimes have to keep myself awake in the classroom.

- Student participant



Many teachers, even those that were skeptical about the new lighting at the beginning, told me at the end of the study that they are also now feeling better.

- Oliver Keis, ZNL researcher

Optimizing lighting conditions help students improve performance

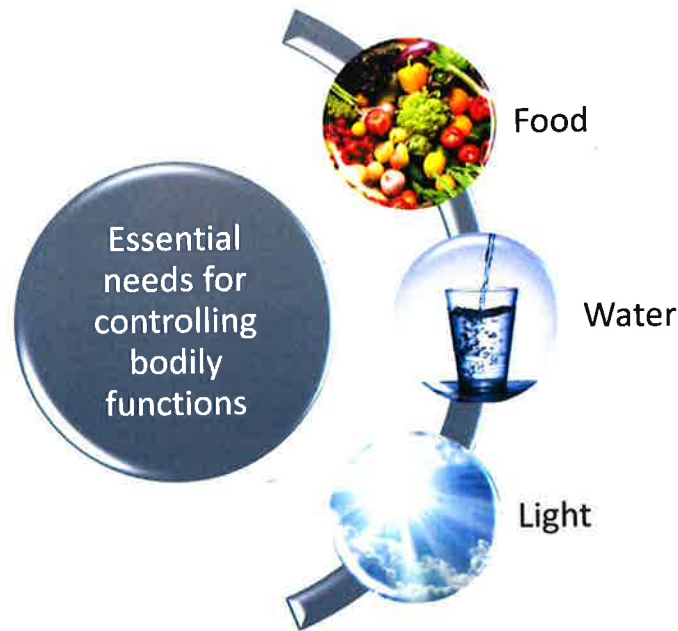
Study conducted by ZNL TransferZentrum für Neurowissenschaften und Lernen (Transfer Center for Neuroscience and Learning) and Osram)

LED Magazine

Study conducted November 2011 – February 2012

Illuminating the Effects of Dynamic Lighting on Student Learning

- Eighty-four third graders were exposed to either focus (6000K-100fc average maintained) or normal lighting. Focus lighting led to a higher percentage increase in oral reading fluency performance (36%) than did control lighting (17%).
- *"Light is the most important environmental input, after food and water, in controlling bodily functions"* - Wurtman, 1975.

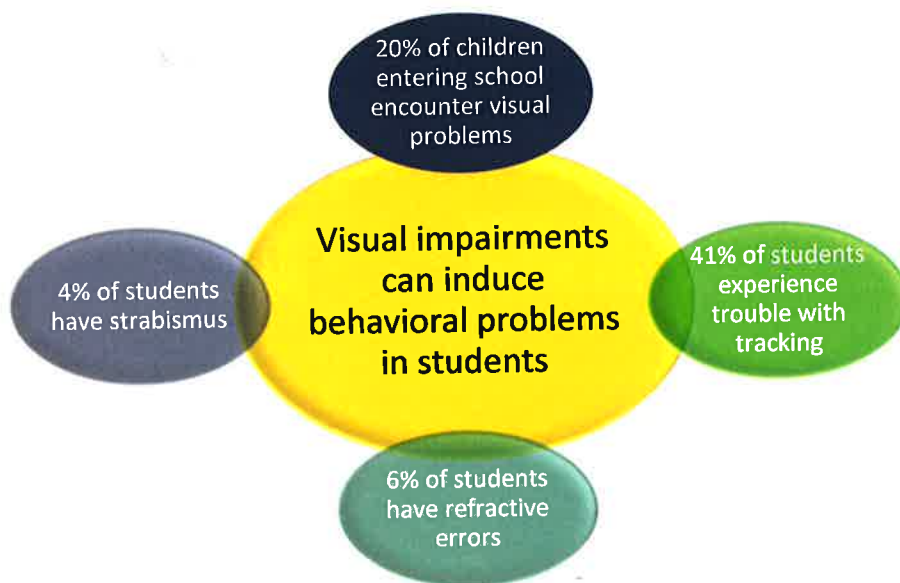


Mood and Cognition

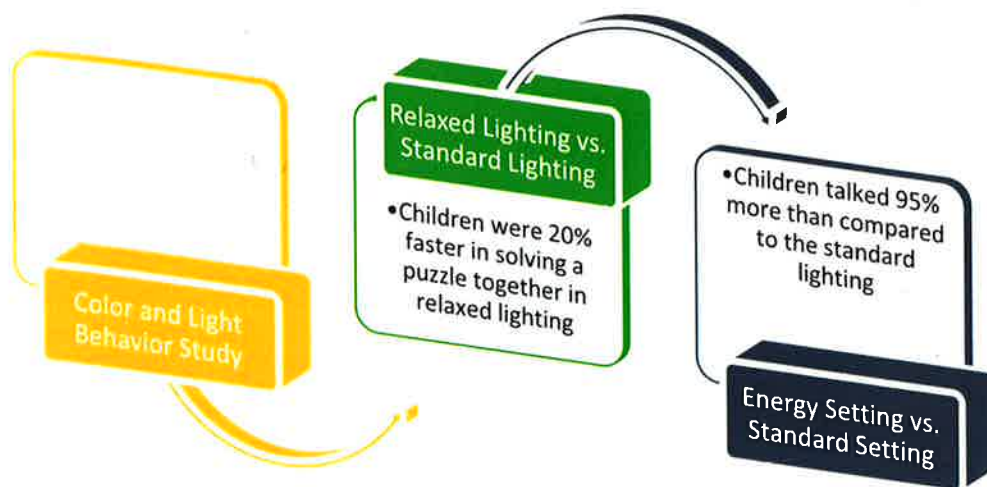
- Lighting can be used to make an architectural space more aesthetically pleasing or it can create an atmosphere in that space; both affect people's emotions.
- Experiments show that females perform better in warm white lighting environments, whereas males performed better on cognitive tasks in cool white lighting.
- Both males and females perceived and responded differently in evaluating the illuminance levels and color index of the lighting and therefore each gender's mood was affected differently.
- Positive mood measures showed no increase in mood in both genders; however, the cooler lighting had a more negative effect on females' moods. Thus, females' performance on cognitive tasks decreased under cooler lighting.
- Lighting's cognitive and mood-related effects on people have noteworthy implications:
 - *Better performance on cognitive related tasks in the workplace or academic environment*
 - *Overall improved quality of life and well-being*

Statistical Evidence on the Effects for Lighting and Learning

- Several studies have addressed how the quality and color of lighting can either impair or enhance students' visual skills and thus, academic performance.



- Certain features of lighting such as flicker from fluorescent lighting and glare can cause discomfort and impair visual and cognitive performance.
- Inefficient forms of fluorescent lighting are shown to cause headaches and impair visual performance.
- Cool white fluorescent lighting in classrooms can drastically improve the behavior of students who are hyperactive or having disadvantages.
- School buildings with the greatest capacity for daylight, such as those with increased window and skylight areas, has a noteworthy effect on students' performance and behavior.
- Cool white fluorescent lighting is recommended to aid in reading speed and accuracy and attentiveness or focus.
- Warm white lighting can assist in helping adults to work together and to minimize conflict.



Illuminating the Effects of Dynamic Lighting on Student Learning
 Michael S. Mott, Daniel H. Robinson, Ashley Walden, Jodie Brunette & Angela S. Rutherford
 The University of Mississippi & The University of Texas
<http://education.olemiss.edu/download/Philips-Research.pdf>
 May 6, 2012

Daylighting and Full-Spectrum Lighting Design³

Problem

- Poor or inappropriate lighting in schools can adversely affect children's health and their ability to learn.
- People spend over 90% of their time indoors.
- Children spend up to 40 hours per week in school buildings, especially when they participate in after-school activities; much of this time is spent under artificial lighting.

Solution

- Studies conducted on schools have reported that the use of "daylight" or "full-spectrum lighting" is associated with healthier students.

Benefits

- Students had fewer cavities, gained weight and grew in height more than students in non-daylight classrooms.
- Students demonstrated better work habits, improved academic performance, resistance to fatigue, and more positive attitudes.
- Schools had greater energy efficiency, significant cost savings and reduced environmental impact.

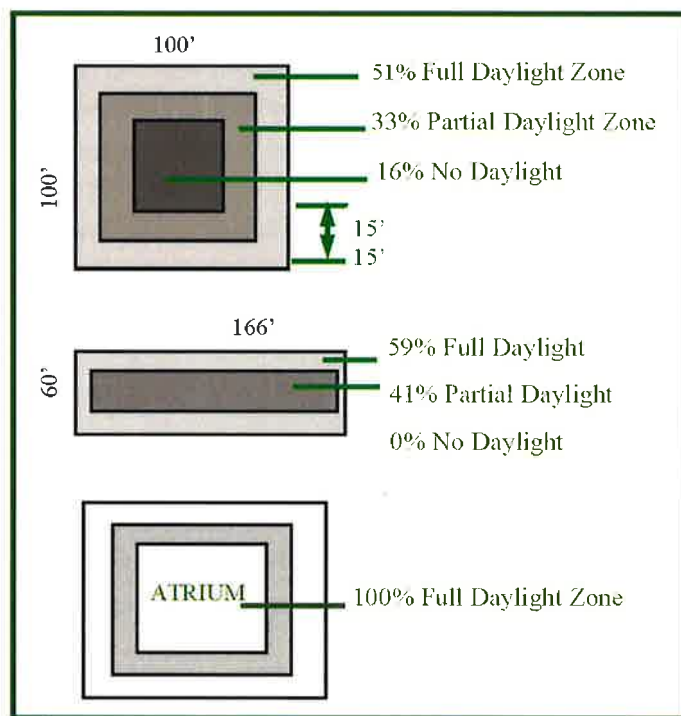
Design Strategies

- "Daylight" design uses skylights and appropriately placed windows to capture daylight in a room or building.
- "Full Spectrum Lighting" design uses full-spectrum florescent lamps (light bulbs) that are strategically placed to mimic daylight.
- These lighting options can be part of the design of a new building or can be incorporated into an existing building during renovation.
- Improved lighting in schools is part of a larger effort to promote "high performance" schools that provide a healthy and productive learning environment.

³ Healthy Schools Network, Inc.; Daylighting; www.healthyschools.org; 2005, 2012

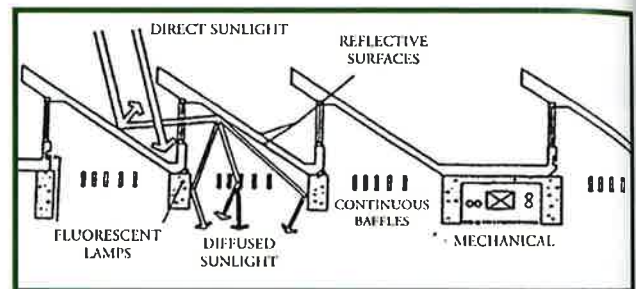
Harvesting Daylight

- Only a small percentage of natural daylight available outdoors needs to be harvested to serve our visual needs.
- Daylight intensity depends upon time of year, time of day and sky conditions.
- A "footcandle" is the light emitted by a single candle across a square foot area.
- At noon on clear summer days the light's intensity is equal to that of over 10,000 footcandles. If only 1% of that light were directed to areas exposed to sunny conditions within building, the light's intensity would be 100 footcandles.
- 100 footcandles is two-times the minimum amount of light needed for reading, and three-times the minimum light needed to work at a computer in a typical classroom.
- Appropriate light for a classroom might be 25 to 50 footcandles, depending upon the student activity.
- Even in winter under totally overcast skies when the light's brightness is similar to that of 1,000 footcandles, a 1% harvest gives off light intensity of 10 footcandles in all directions.
- Schools can be designed to deliver 2% or more of the available daylight to most, if not all spaces. Buildings should also be designed for proper sun and glare control.
- If your school is considering *energy efficiency, undergoing a major renovation, or a new construction project*, tell your Board of Education, the Superintendent, School facility Director, Building Principal or school's architect to use daylighting and full-spectrum lighting.

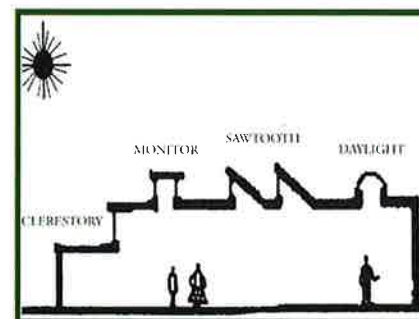


The massing of a building can affect the portion of the floor area benefiting from natural light.

"Illustrations Courtesy of the Sustainable Buildings Industry Council."



Section through a clerestory designed to admit evenly diffused sunlight into a work space.



There are many ways to bring daylight into a building including these overhead methods.

Influence of Lighting on Student Achievement

- One of the most critical physical characteristics of the classroom is lighting.
- Good lighting contributes significantly to the aesthetics and psychological character of the learning space.
- Modifying the existing lighting system could reduce systems costs while providing an improved learning environment through better vision, visual impact and comfort.
- Improper maintenance of fixtures leads to lower than average student performance such as misinterpretation of the written word, whether on a handout or at the chalkboard.
- Students achieve better in classrooms with an 85 or more footcandles environment where others achieved less well.
- Minimum intensity at desk-top level be no less than 10 footcandles for schoolrooms.
- Estimates are that one in ten people are affected by seasonal affective disorder. Illumination seems to be so important that increasing the bright light in a person's environment can successfully treat these conditions.
- Seeing in bad light can lead to the development of ineffective programming of the information collection process which may become habitual.
- Students develop fewer dental cavities, have better attendance achievement, growth and development under full spectrum fluorescent lamps with ultraviolet enhancement than students under other light.
- Florescent fixtures are better than incandescent ones for glare reduction and diffused light production.
- The Illumination Engineering Society recommends 50 footcandles for regular classwork and 100 footcandles for instruction at a chalkboard with at least 20% of wall space devoted to windows
- A minimum of one window per instruction space contributes to the increases of a quality educational environment.
- Provide variety and stimulation while passing between other spaces.



*Influence of the School Facility on Student Achievement
Effects of the School Facility on Student Achievement – Visual (lighting and color)
The University of Georgia
April 1999, Revised by Ken Tanner March 2009*

Sound / Acoustics

The research linking acoustics to learning is consistent and convincing: good acoustics are fundamental to good academic performance.

In one of their many syntheses of existing work, Earthman and Lemasters (1998) reported three key findings: that higher student achievement is associated with schools that have less external noise, that outside noise causes increased student dissatisfaction with their classrooms, and that excessive noise causes stress in students (1998, 18).

Outside noise causes increased student dissatisfaction with their classrooms, and that excessive noise causes stress in students

Crandell et al. (1995) and Nabelek and Nabelek (1994) reviewed the literature linking the acoustical environment in a classroom to the academic achievement of children and have linked levels of classroom noise and reverberation to reading and spelling ability, behavior, attention, concentration, and academic achievement in children (also ASHA 1995, Crandell 1991, Crandell and Bess 1986, and Crandell et al. 1995). Evans and Maxwell (1999) examined 100 students enrolled in two New York City schools, one of which was in the flight path of an airport. The students exposed to the air-traffic noise scored as much as twenty percent lower on a reading test than children in the other school.

Noise levels influence verbal interaction, reading comprehension, blood pressure, and cognitive task success and may induce feelings of helplessness, inability to concentrate, and lack of extended application to learning tasks

There also is evidence of a cumulative effect of excessive classroom noise on a child's academic achievement level. These problems are more acute for children who may have hearing impediments and may affect the detection of such impediments (Nelson and Soli 2000). It also is generally agreed (Fisher 2000) that high noise levels cause stress.

Teachers attach importance to noise levels in classrooms and schools. Lackney (1999) found that

teachers believe that noise impairs academic performance. Indeed, it appears that external noise causes more discomfort and lowered efficiency for teachers than for students (Lucas 1981). This factor could lower the quality of teaching and, ultimately, learning.

Clearly, classroom acoustics matter, and yet Feth and Whitelaw (1999) found that the acoustics of many classrooms are poor enough to make listening and learning difficult for children. Their study of thirty-two classrooms in central Ohio primary schools found that only two met the standards recommended by the American Speech- Language- Hearing Association (ASHA).

Other studies cite acoustics problems in schools. For example, a third of the school systems cited in a 1995 General Accounting Office study reported that poor acoustics were their most serious environmental concern (General Accounting Office 1995). Studies of elementary and secondary school classrooms revealed that excessive background noise, which competes with the speech of teachers, aides, classmates, and audio-educational media, is common even in new classrooms (U.S. Architectural and Transportation Barriers Compliance Board 1999).

Research indicates that high levels of background noise, much of it from heating and cooling systems, adversely affect learning environments, particularly for young children, who require optimal conditions for hearing and comprehension.

Many existing HVAC systems, particularly room unit ventilators, will exceed these noise standards.

Acoustical performance is an important consideration in the design of classrooms, according to the U.S. Architectural and Transportation Barriers Compliance Board (2002), an independent federal agency devoted to accessibility for people with disabilities. The board writes:

Research indicates that high levels of background noise, much of it from heating and cooling systems, adversely affect learning environments, particularly for young children, who require optimal conditions for hearing and comprehension. Poor acoustics are a particular barrier to children with a hearing loss. For the past several years, the Board has worked with the private sector in the development of classroom acoustics standards as an alternative to rulemaking of its own. In 1999, the Board partnered with the Acoustical Society of America (ASA) on the development of a new standard for acoustics in classrooms that takes into account children who are hard of hearing. The standard, completed in 2002, has been approved as ANSI/ASA S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. It sets specific criteria for maximum background noise (thirty-five decibels) and reverberation (0.6 to 0.7 seconds for unoccupied classrooms). These and other specifications are consistent with long-standing recommendations for good practice in acoustical design.

When these standards are implemented, schools may face significant costs. For example, many existing HVAC systems, particularly room unit ventilators, will exceed these noise standards.

Indoor Learning Environment Assessments (to be completed)

Intuitively, we all know that clean, quiet, safe, comfortable, and healthy environments are an important component of successful teaching and learning. Research has proven that the quality of air, lighting, acoustics, temperature, humidity, and architectural finishes have a direct, positive correlation with student performance and staff productivity.

During our comprehensive, physical needs assessment of West Central Area Schools' facilities, Unesco will make data-driven assessments of the learning environments. On the following pages, we provide examples of assessments we have made while supporting other districts.

Temperature/Humidity (and other) Survey - EXAMPLE

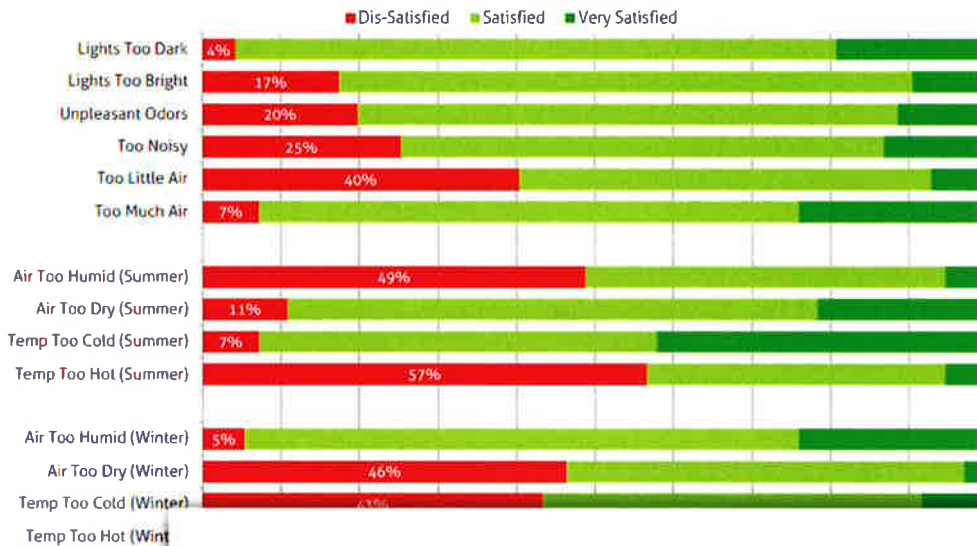
While we conduct data logging of temperature and humidity of classrooms and other indoor environments, a good way to gain longitude information is to understand the perceptions of staff. We accomplish this with an online survey that will encumber staff for roughly 1 to 2 minutes. Examples of results are below.

May 23, 2016

Kaukauna Area School District

Indoor Environment Survey Results

District-Wide Summary²



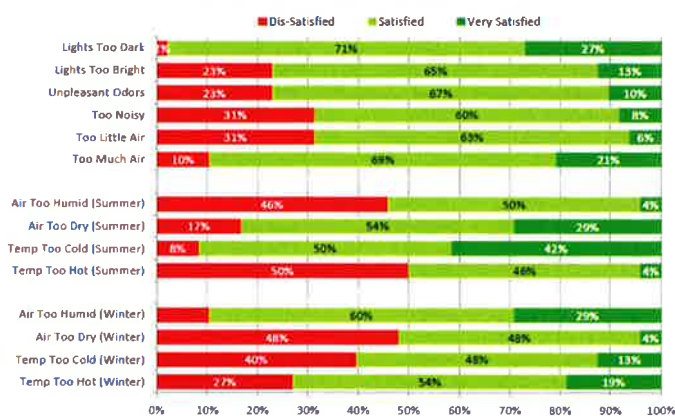
Example

May 23, 2016

Kaukauna Area School District

River View Middle School

- When the weather is nice, the room temperature can get to 80 degrees or higher. It usually makes out the thermostat.
- I have 1 vent that I am aware of that comes into the room. The students that sit near it freeze from October through April. The rest of the room feels little if any circulation unless the windows are open. In late summer, early fall, it is actually more comfortable to keep the windows closed than open because there is less humidity in my room than outside. Too much air flow answer is based on someone sitting near the vent.
- I think the PA system has a short. It will break in and out during announcements. My room has a mildew odor. I have 3 air fresheners to combat the smell.
- In general, I feel there are way too many "hot" and "stuffy" areas than cold throughout the whole building.
- They have repaired the airflow situation as best they can again this year. It seems to go out every year.
- Lately when I walk in the room in the morning, my glasses fog up. The floor in the SE corner is so hot that students cannot touch their instruments if they have been left sitting there. There is often times a damp smell. There is no sound proofing between music rooms. All music classes can hear each other. Sometimes water falls from the ceiling. There is no natural light. There is no practical place for students to go for small group work while playing their instruments except in the hallway which disturbs others.
- This is my first year in this room. I think it is too hot in general. There were many days this winter when I had to open the windows because there was too much hot air coming through the blowers. I couldn't wear my usual winter wardrobe. If I did, I would be sweating!
- I have my own heating/air unit and able to vary temperature as needed. Very cold in winter if I don't run the heater occasionally. Smells in summer/Fall time when hot out. I think it may be from dead bugs that occur outside the windows but unsure.
- Temperature is difficult to regulate in an old building. I get it. But some days it makes it hard to concentrate when it is so hot (summer and winter). Grateful for windows.
- The lighting in the room doesn't make any sense. If it were revised so that half the lights could be dimmed, it would really help.
- I really do not have any major issues. Once in a while the system needs adjusting (2-3 times a year) because it gets really hot or really cold.
- I am very fortunate that my room is connected to an air conditioning unit. If it wasn't, it would greatly impact my answers above. The majority of the school is definitely too hot for learning in the late summer/early spring.
- In the summer fall the humidity and heat is at times unbearable. There are no windows to open or a way to circulate cool air. It makes me and the students feel physically ill with headaches and fatigue. There is an order to the room for the same reason. no real air circulation. There is something blowing constantly... but it really accomplishes nothing as far as I can tell.
- The temp varies within the day and day by day. It does from too cold to too hot and back and forth all day every day.
- In the winter, our building is either really cold or really hot.
- There is a strong blast of heat for about 15 minutes at 7:30am and it is toasty warm and then it cools all day long. A more consistent temp would be great.
- My room temperature is currently just right.
- In the beginning of April, my room was extremely cold for a few days when the weather became warmer. 44 is average per hour x4 per day.
- It's a nice room to work in.
- Room F204 begins warm most mornings at the start of the day then stabilizes as the day progresses during the school year. Some lights are kept off to reduce brightness within the room.
- The grate/vent built into the door makes a loud noise when the door is closed and the air is moving.
- Cold air blows and students complain. My door rattles and whistles when it is closed to keep out noise.
- Sometimes on particularly hot days the temp takes a few hours to get to normal. I always seem to have a few days a year where the AC doesn't kick in and it gets to about 78 degrees in my room.
- Air purifier especially in boy's locker room.



² Survey conducted from 4/23/16 to 5/1/16
Confidential and Proprietary Information of Unesco, Inc.

Confidential and Proprietary Information of Unesco, Inc.

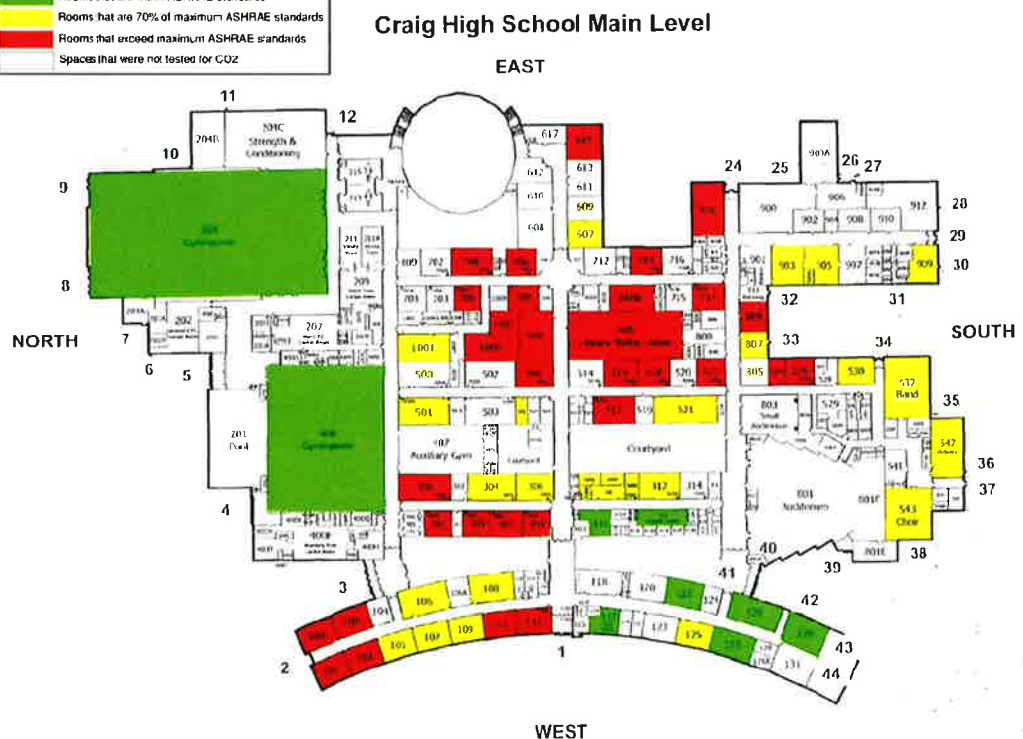
Facility Condition and Performance | Page 21

Indoor Air Quality Assessment - EXAMPLE

There are a variety of measuring indoor air quality. Methods range from simple CO₂ measurement to complicated ventilation assessments involving a plan/design review and air flow measurement. Below, are examples of CO₂ measurement.

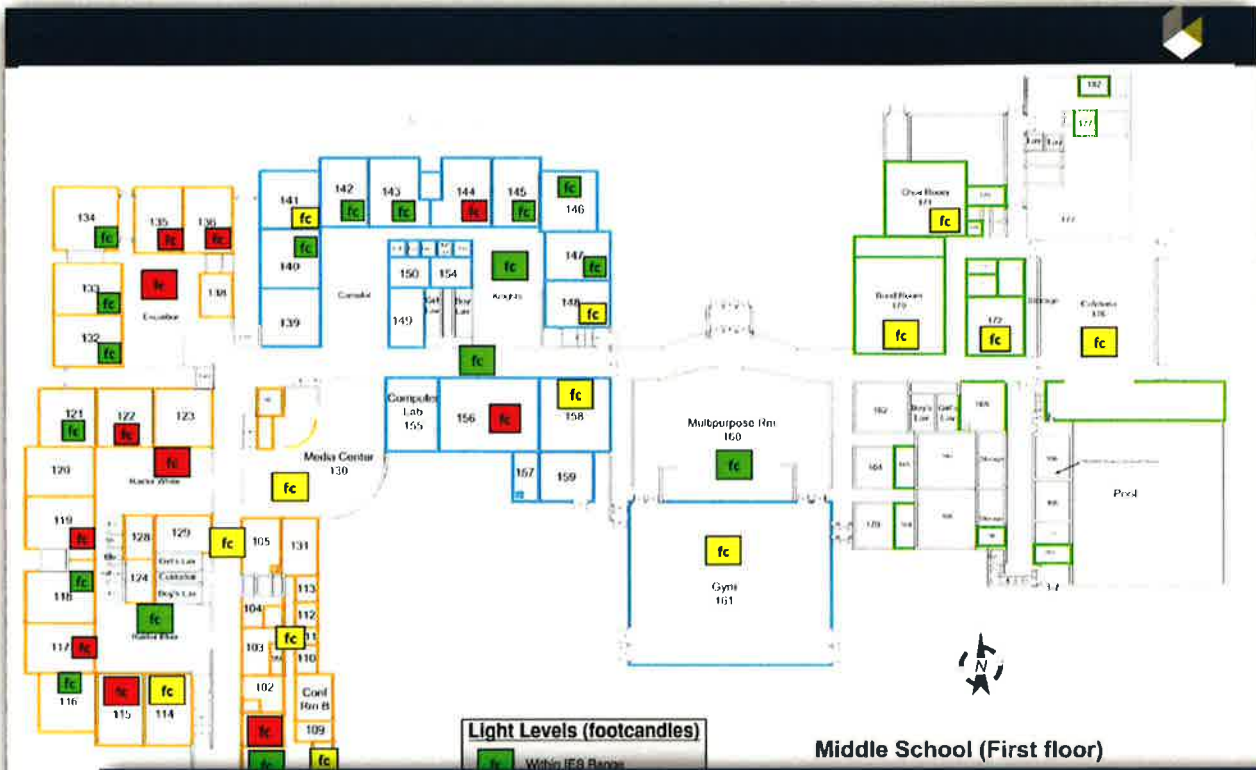
Janesville SD - % Schools Above ASHRAE CO ₂ Standards							
School	Measurements						
Elementary Schools	# CO2 Readings	CO2 >ASHRAE	CO2 >70% ASHRAE	CO2 = ASHRAE	% >ASHRAE	% > 70% ASHRAE	% = ASHRAE
Adams	31	18	10	3	58.06%	32.26%	9.68%
Harrison	28	4	21	3	14.29%	75.00%	10.71%
Jackson	30	6	16	8	20.00%	53.33%	26.67%
Jefferson	39	14	22	3	35.90%	56.41%	7.69%
Kennedy	31	8	18	5	25.81%	58.06%	16.13%
Lincoln	36	8	20	8	22.22%	55.56%	22.22%
Madison	27	14	10	3	51.85%	37.04%	11.11%
Monroe	32	12	11	9	37.50%	34.38%	28.13%
Roosevelt	37	12	19	6	32.43%	51.35%	16.22%
Van Buren	31	18	13	0	58.06%	41.94%	0.00%
Washington	36	14	19	3	38.89%	52.78%	8.33%
Wilson	42	8	19	15	19.05%	45.24%	35.71%
Middle Schools							
Edison	33	2	20	11	6.06%	60.61%	33.33%
Franklin	45	15	12	18	33.33%	26.67%	40.00%
Marshall	55	44	10	1	80.00%	18.18%	1.82%
High Schools							
Craig	79	37	27	15	46.84%	34.18%	18.99%
Parker	81	34	33	14	41.98%	40.74%	17.28%
District Office							
ESC							
Total							

CO ₂ Testing	
■	Rooms that are within ASHRAE standards
■	Rooms that are 70% of maximum ASHRAE standards
■	Rooms that exceed maximum ASHRAE standards
■	Spaces that were not tested for CO ₂

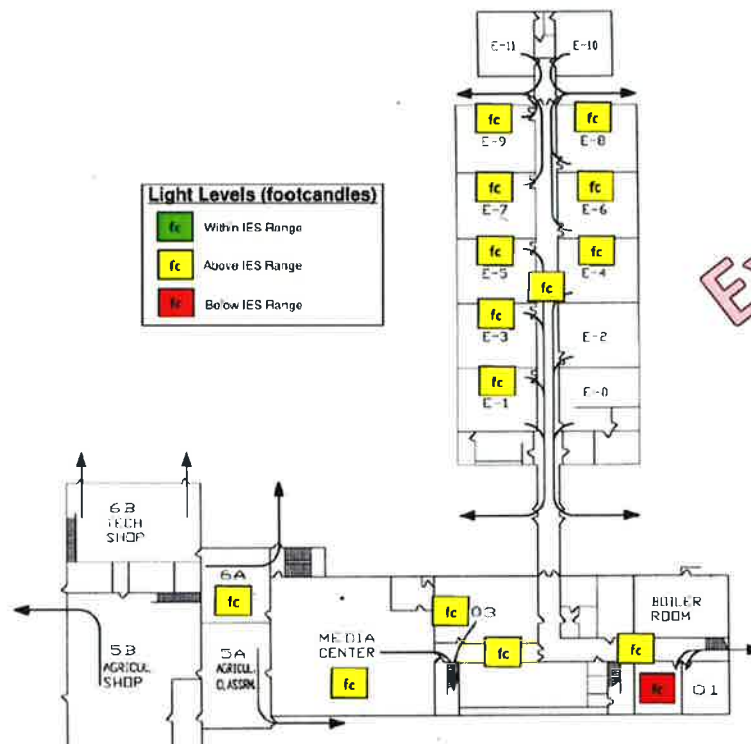


Example

Lighting Level Assessment - EXAMPLE



Current Lighting Levels – Lower Level



November 20, 2017

Acoustical Level Assessment - EXAMPLE

Riverview Middle School

Math Classroom - Room 157

Mrs. J. Nelson

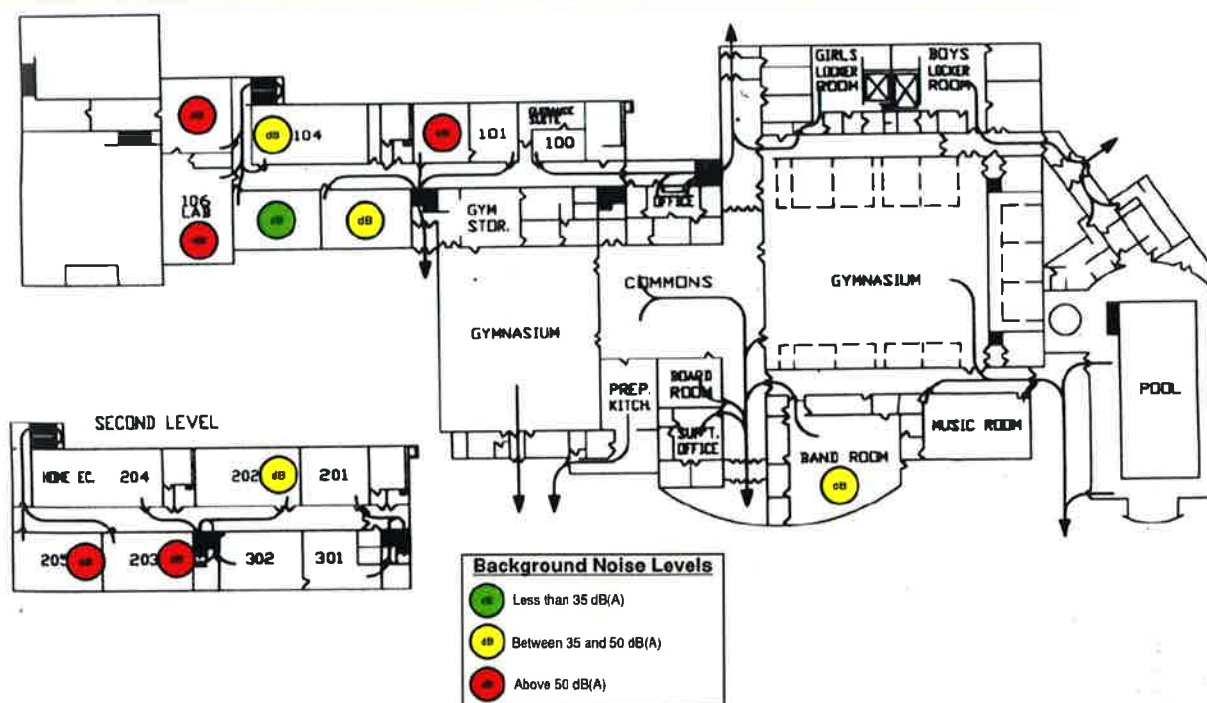


Why do acoustics matter?

1. Up to 60% of classroom activities involve speech between teachers and students or between students, indicating the importance of environments that support clear communication.
2. Inappropriate levels of background noise can also inhibit reading and spelling ability, behavior, attention, concentration, and academic performance.

ANSI-ASA design standards call for background noise levels to be below 35 dB(A) at the source (i.e. Unit Ventilator), as measured when the room is empty, the door is closed and only HVAC equipment is running.

Math Teacher, Mrs. J. Nelson, commented that she is "unable to hear students while standing at the front of the classroom near the window".



Facility / Infrastructure Age Assessment

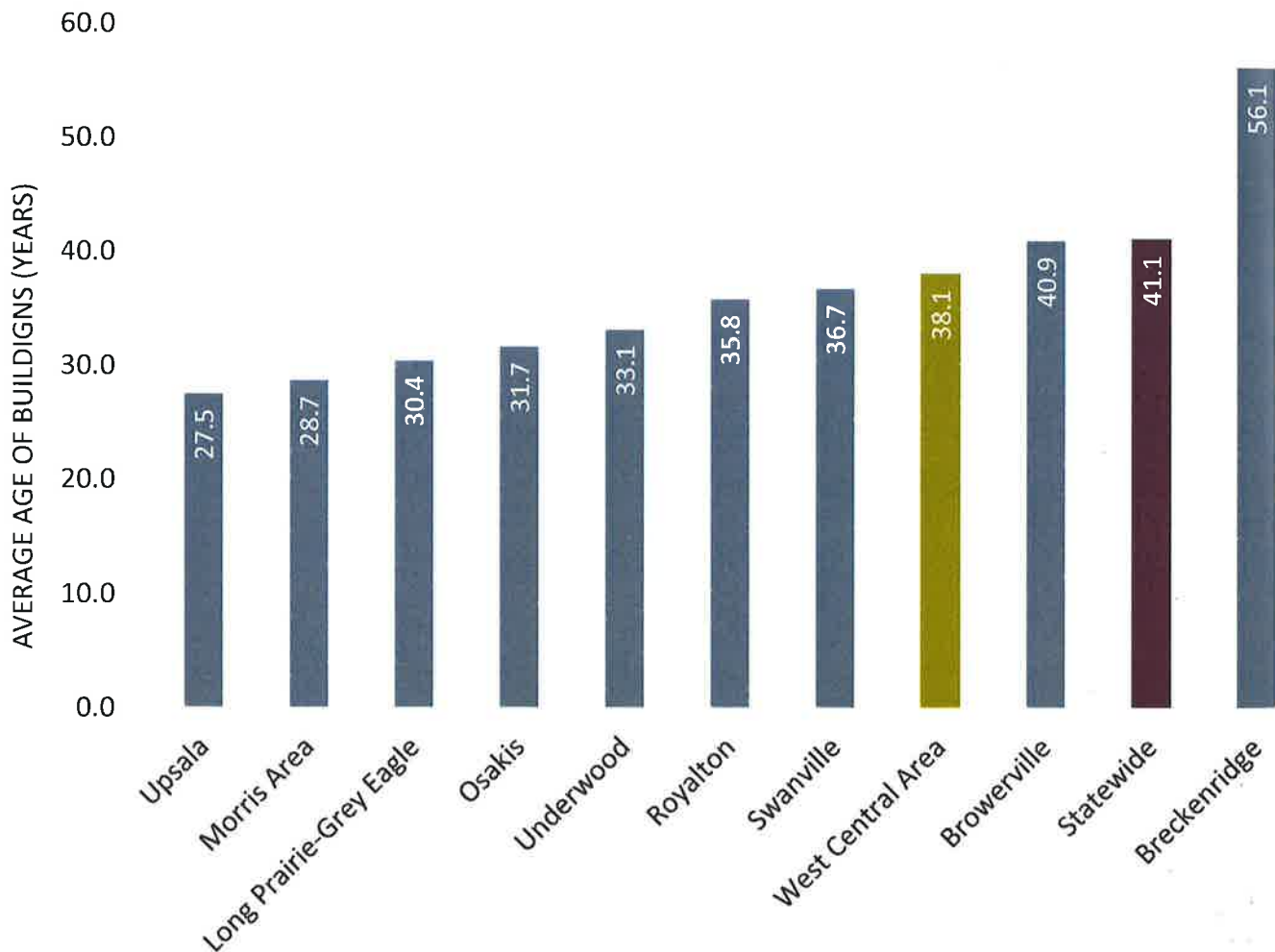
Growing Deferred Maintenance Challenges

Along with roads and highways, schools are one of the United States' largest infrastructure investments. The nation's 80,000 schools suffer under a \$25 billion backlog of repairs costing nearly \$240 billion to replace. The statewide average age of school facilities in Minnesota is a staggering 40 years old according to information from the Minnesota Department of Education. The following table illustrates West Central Area Schools' data from the MDE website, which reflects an average age of 38.1 years.

Buildings built in the early years of this century - or before - frequently were built for a life span of 50 to 100 years, while more modern buildings, particularly those built after 1970, were designed to have a life span of only 20 to 30 years.

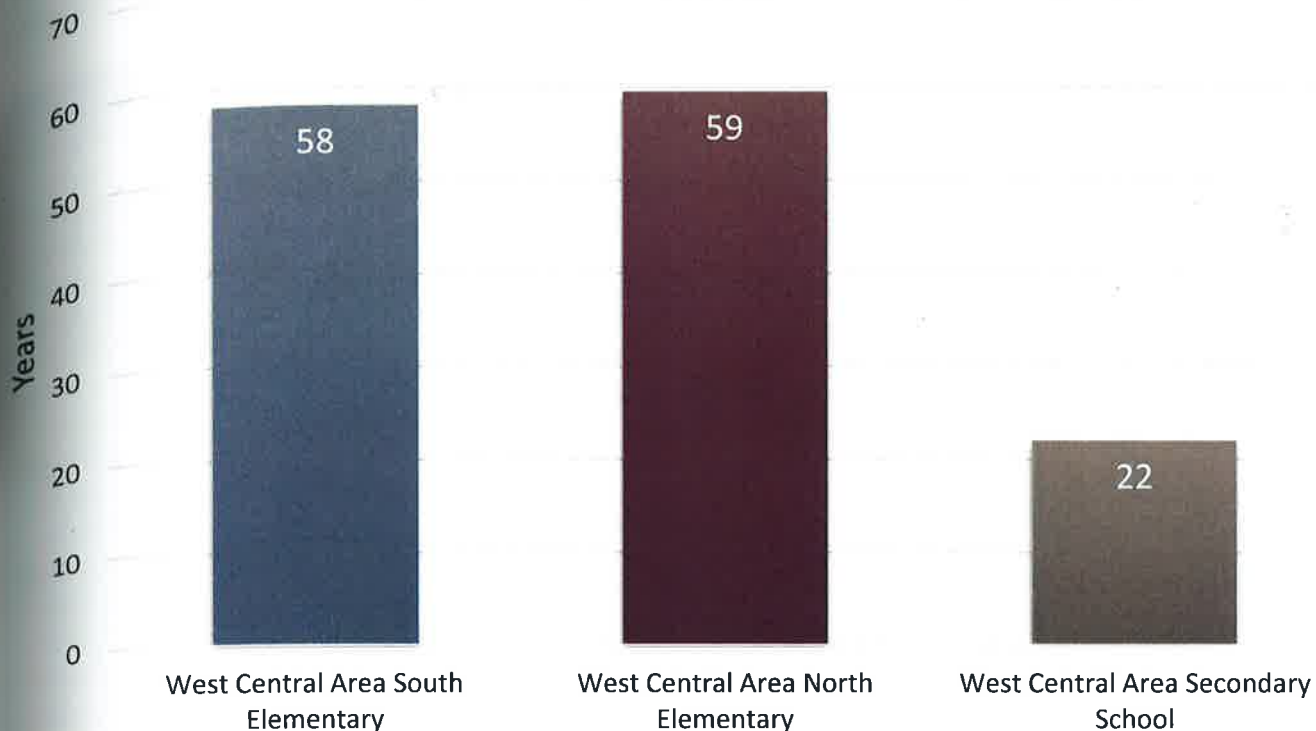
Engineered Systems (1998)

Area District Average Building Age⁴

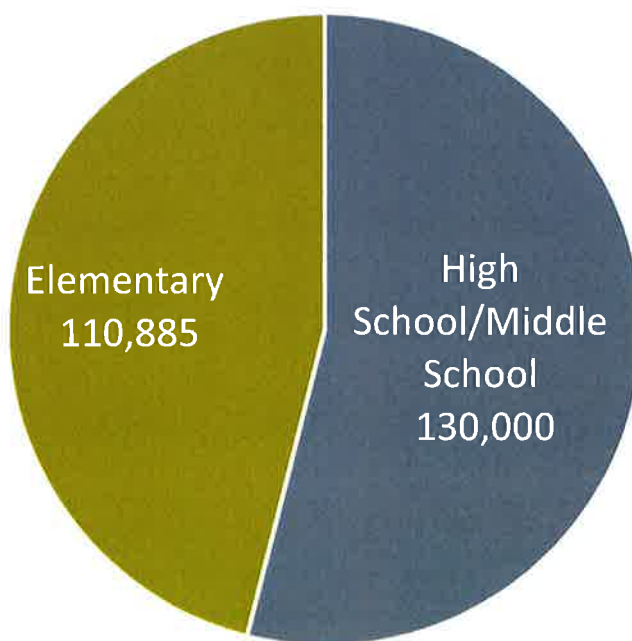


⁴ Source: Minnesota Department of Education Building Age Report 2016.

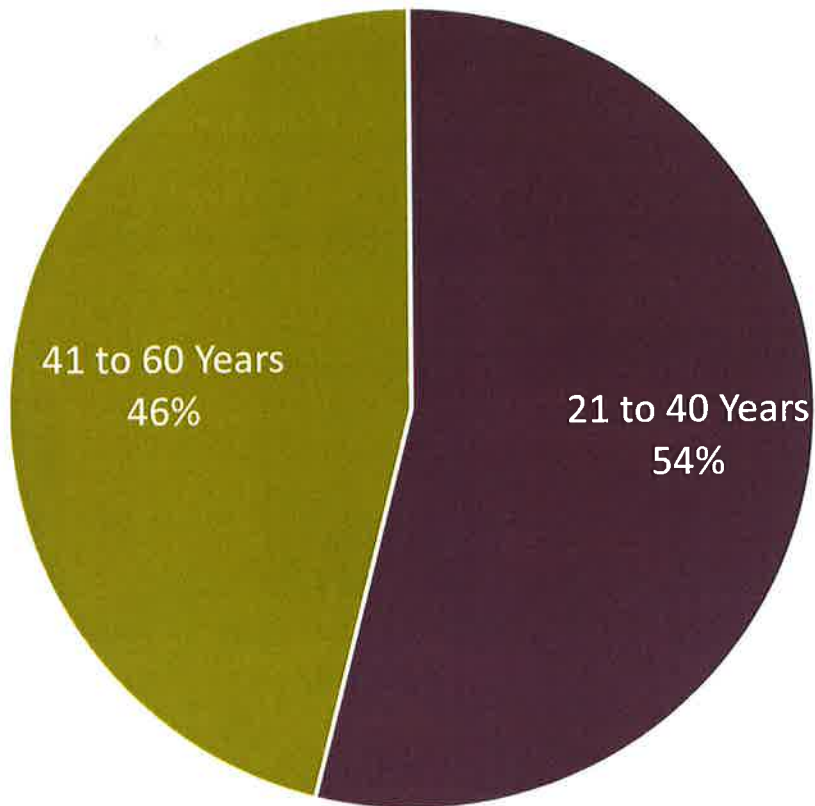
Age of Buildings



Facility Square Feet Breakdown



Age of the Facility Square Feet



November 20, 2017

Equipment Life Expectancy Chart

This chart illustrates average life expectancy of commercial building systems:

Equipment Item	Median Years	Equipment Item	Median Years
Air Conditioners	10	Coils	
Window Unit	15	DX, Water, or Steam	20
Residential single or split system	15	Electric	15
Commercial through-the-wall	15	Heat Exchangers	
Water cooled package	15	Shell-and-tube	24
Heat Pumps	15	Reciprocating Compressors	20
Residential air-to-air	15	Package Chillers	
Commercial air-to-air	19	Reciprocating	20
Commercial water-to-air	19	Centrifugal	23
Roof Top Air Conditioners	15	Absorption	23
Single zone	15	Cooling Towers	
Multizone	15	Galvanized metal	20
Boilers, Hot Water (Steam)		Wood	20
Steel water-tube	24 (30)	Ceramic	34
Steel fire tube	25 (25)	Air Cooled Condensers	20
Cast iron	35 (30)	Evaporative Condensers	20
Electric	15	Insulation	
Burners	21	Molded	20
Furnaces		Blanket	24
Gas or oil fired	18	Pumps	
Unit Heaters		Base-mounted	20
Gas or electric	13	Pipe-mounted	10
Hot water or steam	20	Sump and Well	10
Air Terminals		Condensate	15
Diffusers, grilles and registers	27	Reciprocating Engines	20
Induction and fan-coil units	20	Steam Turbines	30
VAV and double-duct boxes	20	Electric Motors	18
Air Washers	17	Motor Starters	17
Ductwork	30	Electric Transformer	30
Dampers	20	Controls	
Fans		Pneumatic	20
Centrifugal	25	Electric	16
Axial	20	Electronic	15
Propeller	15	Valve Actuators	
Ventilating roof-mounted	20	Hydraulic	15
		Pneumatic	20
		Self-contained	10

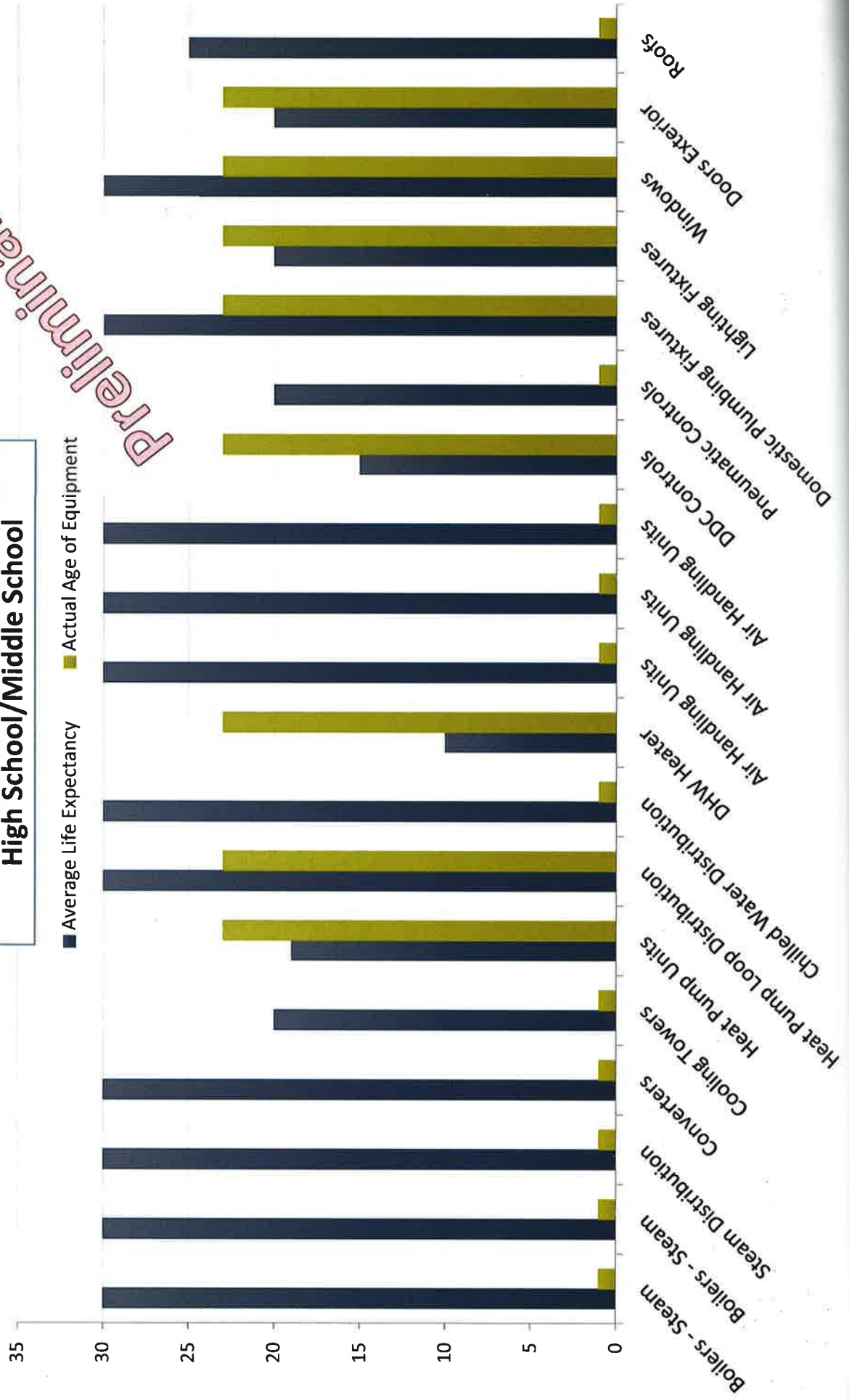
ASHRAE 2011 (HVAC Application Handbook, Chapter 37.3)

System Age Summaries (Preliminary)

Preliminary

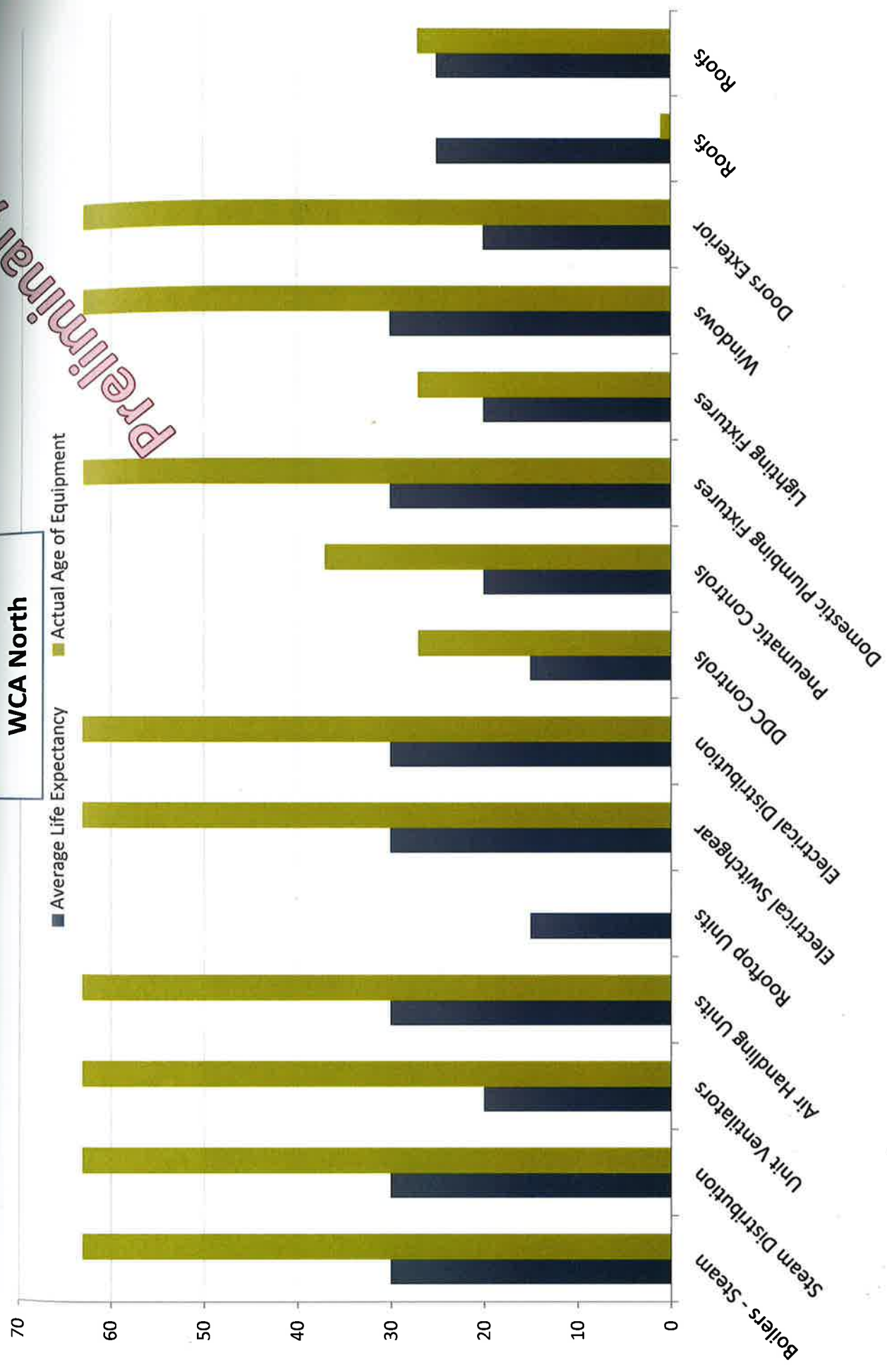
High School/Middle School

■ Average Life Expectancy ■ Actual Age of Equipment



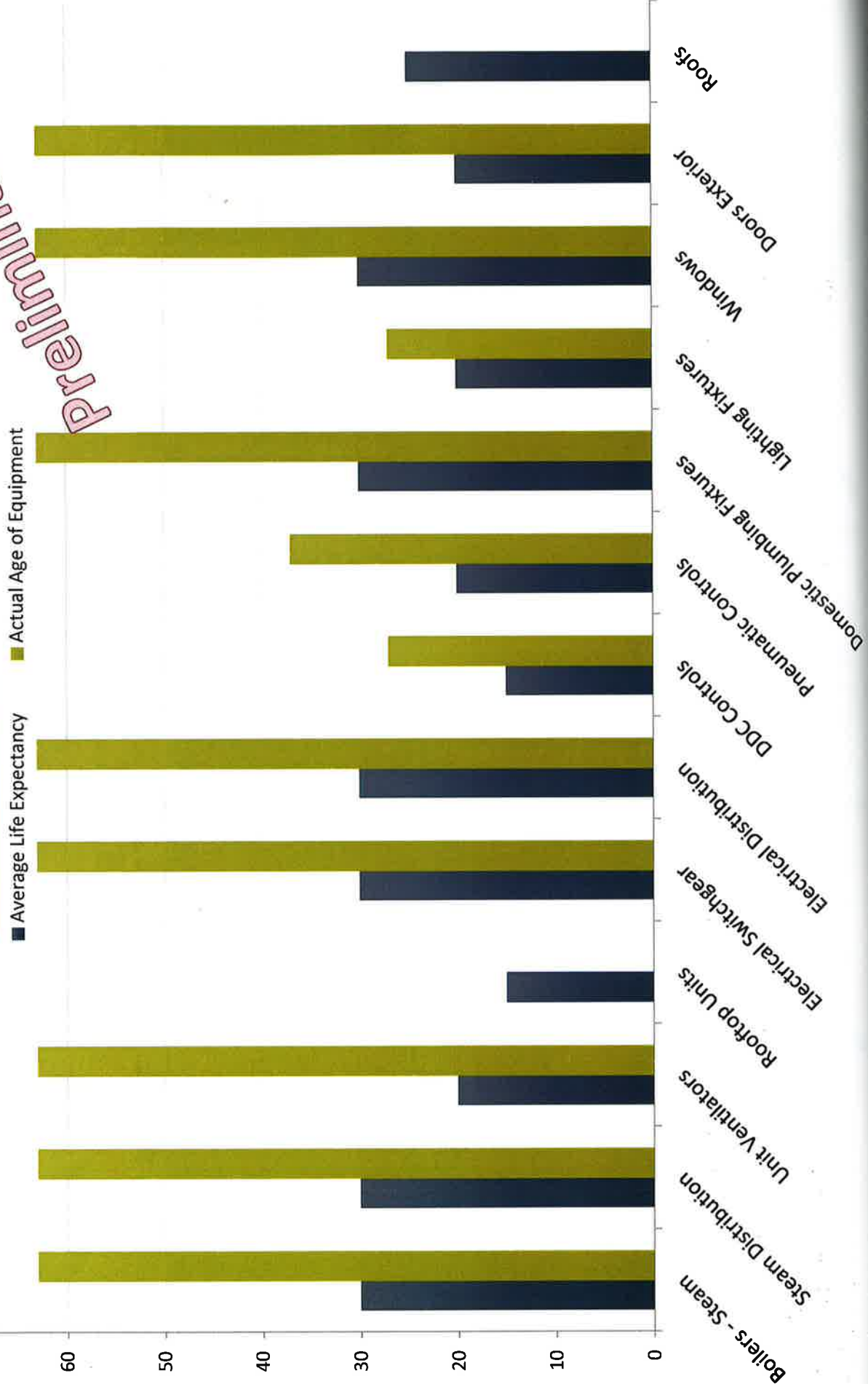
WCA North

■ Average Life Expectancy ■ Actual Age of Equipment



Preliminary

High School/Middle School



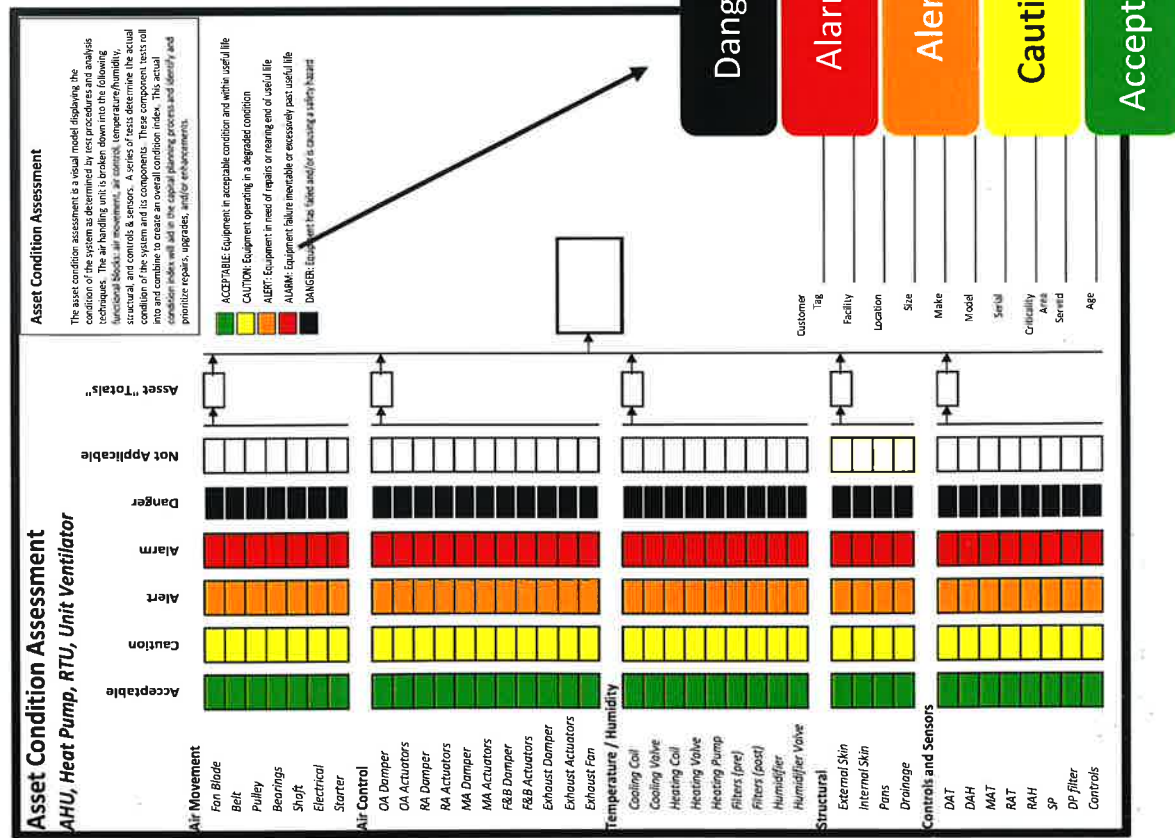
Preliminary

Asset Condition Assessment

Methodology

During our comprehensive facility assessment, Unesco will perform a physical condition assessment of the systems that comprise West Central Area Schools' facility infrastructure. These assessments will be conducted by technical analysts who have significant experience in assessing facility systems. The methodology employed when conducting these analyses will be an Asset Condition Assessment worksheet (similar to the adjacent image), identifying specific areas of the equipment to review. In each of these areas, the technical analyst will identify the functional working condition, and those metrics are later further refined to an overall condition assessment of the equipment. The evaluation of equipment is divided into five general categories:

Once we complete physical assessment, we will evaluate system age to adjust the overall equipment condition to predict unplanned system failures and large capital expenditures.

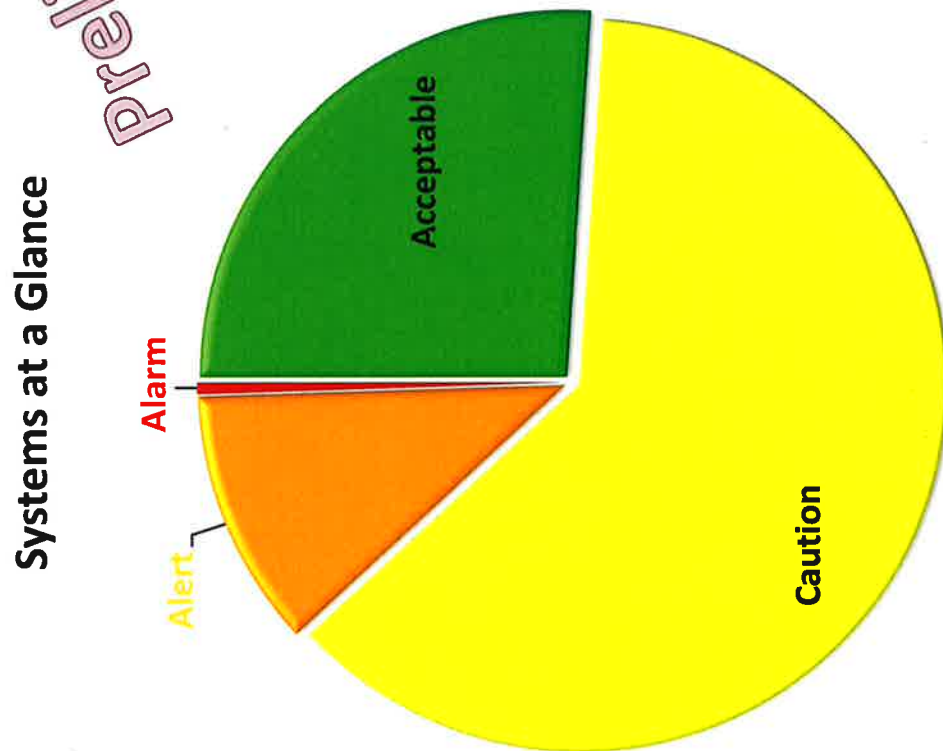
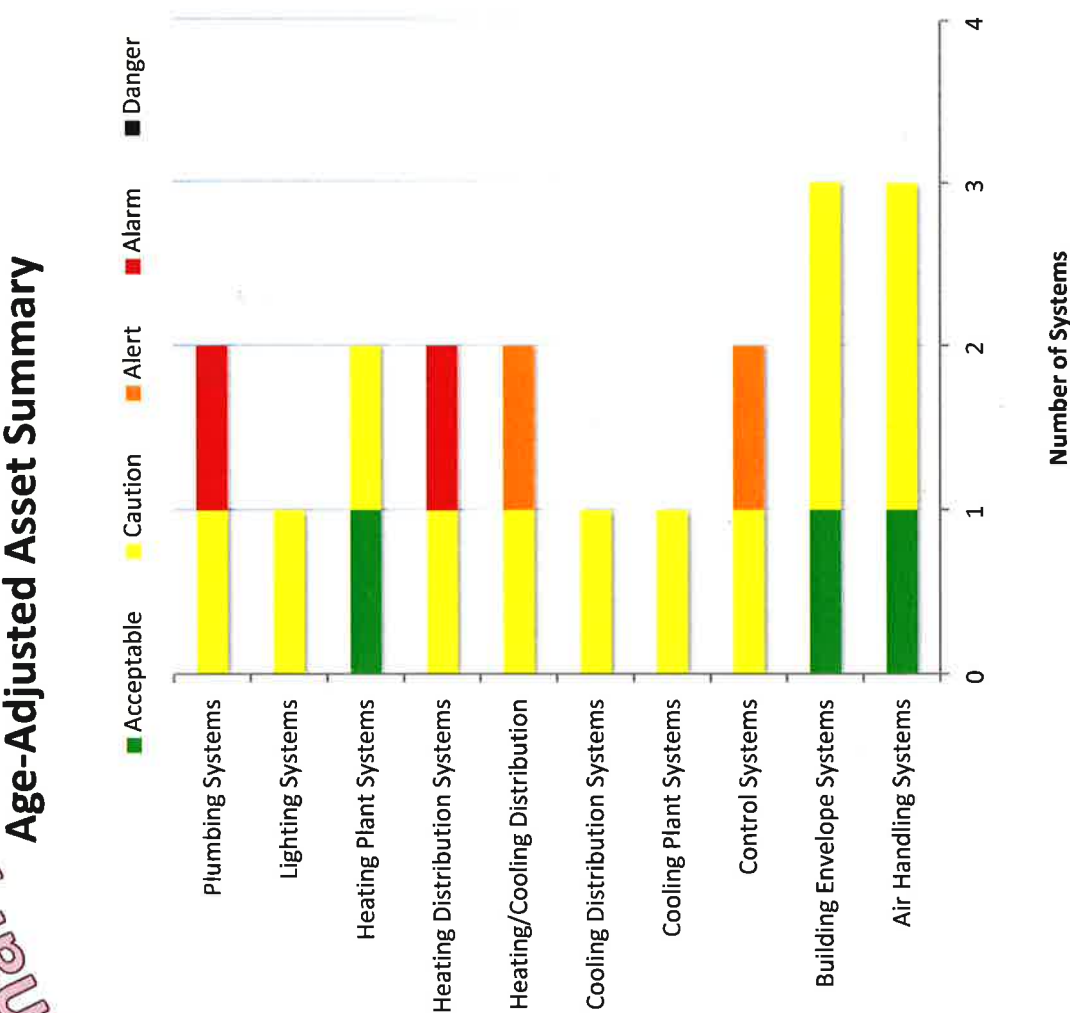


High School/Middle School – Asset Condition Assessment

System		System Category		Equipment Age and Life Expectancy				Asset Condition Assessment				Current Concerns/Problems								
				Average Life Expectancy	Equipment Installation Date	Actual Age of Equipment	Percent of Life Expectancy Used	Remaining Life	Asset Condition Assessment	Age-Adjusted Asset Condition	Repair/Replace Priority	Energy Efficiency	Ventilation/IAQ	Temperature Levels/Control	Humidity Levels/Control	Light Levels/Type	Reliability/Recent Failure	Code Compliance	Doesn't Meet Educational Needs	Difficult to Maintain
Preliminary	Boilers - Steam	Heating Plant Systems	30	2016	1	3%	29	Caution	Caution	4	x	x								
	Boilers - Steam	Heating Plant Systems	30	2016	1	3%	29	Acceptable	Acceptable	5	x	x								
	Steam Distribution	Heating Distribution Systems	30	2016	1	3%	29	Alarm	Alarm	2	x	x			x					
	Converters	Heating Distribution Systems	30	2016	1	3%	29	Caution	Caution	4	x	x			x					
	Cooling Towers	Cooling Plant Systems	20	2016	1	5%	19	Caution	Caution	4	x	x								
	Heat Pump Units	Heating/Cooling Distribution	19	1994	23	121%	(4)	Caution	Alert	3	x	x	x						Heat pumps have begun to fail. Some compressors have been replaced.	
	Heat Pump Loop Distribution	Heating/Cooling Distribution	30	1994	23	77%	7	Acceptable	Caution	4	x	x	x							
	Chilled Water Distribution	Cooling Distribution Systems	30	2016	1	3%	29	Caution	Caution	4	x	x	x							
	DHW Heater	Plumbing Systems	10	1994	23	230%	(13)	Alert	Alarm	2	x				x					
	Air Handling Units	Air Handling Systems	30	2016	1	3%	29	Caution	Caution	4	x	x	x							
	Air Handling Units	Air Handling Systems	30	2016	1	3%	29	Caution	Caution	4	x	x	x							
	Air Handling Units	Air Handling Systems	30	2016	1	3%	29	Acceptable	Acceptable	5	x	x	x							
	DDC Controls	Control Systems	15	1994	23	153%	(8)	Acceptable	Alert	3	x	x	x					x		Heat P pump controllers are obsolete and in need of replacement.
	Pneumatic Controls	Control Systems	20	2016	1	5%	19	Caution	Caution	4	x	x	x			x				
	Domestic Plumbing Fixtures	Plumbing Systems	30	1994	23	77%	7	Acceptable	Caution	4	x					x				
	Lighting Fixtures	Lighting Systems	20	1994	23	115%	(3)	Acceptable	Caution	4	x	x				x				District has begun replacing with LED lighting technology
Windows	Building Envelope Systems	30	1994	23	77%	7	Acceptable	Caution	4	x										
Doors Exterior	Building Envelope Systems	20	1994	23	115%	(3)	Acceptable	Caution	4	x										
Roofs	Building Envelope Systems	25	2016	1	4%	24	Acceptable	Acceptable	5						x				Roofing replaced in 2016.	

High School/Middle School - Asset Summary

Age-Adjusted Asset Summary

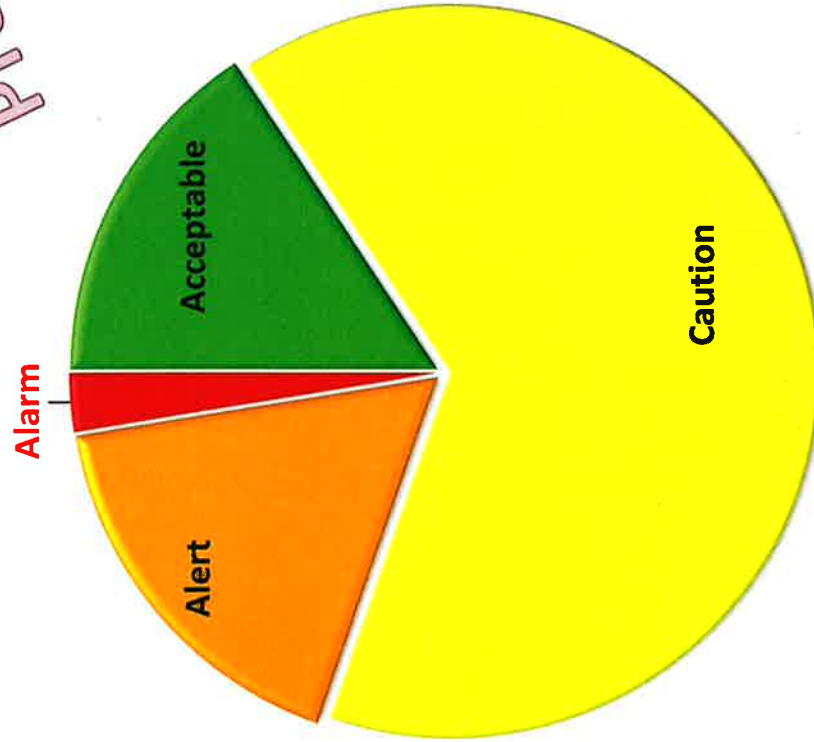


WCA North Elementary – Asset Contrition Assessment

System			Equipment Age and Life Expectancy			Asset Condition Assessment				Current Concerns/Problems									
			Average Life Expectancy	Equipment Installation Date	Actual Age of Equipment	Percent of Life Expectancy Used	Remaining Life	Asset Condition Assessment	Age-Adjusted Asset Condition	Repair/Replace Priority	Energy Efficiency	Ventilation/IAQ	Temperature Levels/Control	Humidity Levels/Control	Light Levels/Type	Reliability/Recent Failure	Code Compliance	Doesn't Meet Educational Needs	Difficult to Maintain
Boilers - Steam	Heating Plant Systems	Entire Building	30	1954	63	210%	(33)	Caution	Alarm	2	x	x							Most of the steam and condensate piping is original
Steam Distribution	Heating Distribution Systems	Entire Building	30	1954	63	210%	(33)	Alert	Alarm	2									
Unit Ventilators	Air Handling Systems	Classrooms	20	1954	63	315%	(43)	Caution	Alarm	2		x	x						
Air Handling Units	Air Handling Systems	Gymnasiums, Shops, Media Centers	30	1954	63	210%	(33)	Alarm	Alarm	2	x	x	x			x		x	
Rooftop Units	Air Handling Systems	New Secure Office Area	15	2017	0	0%	15	Acceptable	Acceptable	5									Secure office area remodel project
Electrical Switchgear	Electrical Systems	Entire Building	30	1954	63	210%	(33)	Caution	Alarm	2									
Electrical Distribution	Electrical Systems	Entire Building	30	1954	63	210%	(33)	Caution	Alarm	2							x		
DDC Controls	Control Systems	Central Plant	15	1990	27	180%	(12)	Caution	Alert	3	x	x					x		
Pneumatic Controls	Control Systems	Entire Building	20	1980	37	185%	(17)	Caution	Alert	3	x	x					x		
Domestic Plumbing Fixtures	Plumbing Systems	Entire Building	30	1954	63	210%	(33)	Acceptable	Alarm	2	x						x		
Lighting Fixtures	Lighting Systems	Entire Building	20	1990	27	135%	(7)	Acceptable	Caution	4	x						x		District has begun replacing with LED lighting technology
Windows	Building Envelope Systems	Entire Building	30	1954	63	210%	(33)	Caution	Alarm	2	x						x		
Doors Exterior	Building Envelope Systems	Entire Building	20	1954	63	315%	(43)	Acceptable	Alarm	2	x						x		
Roofs	Building Envelope Systems	North Gym / West Wing	25	2016	1	4%	24	Acceptable	Acceptable	5									New in 2016
Roofs	Building Envelope Systems	Remainder of the Building	25	1990	27	108%	(2)	Caution	Alert	3	x						x		Various roof sections

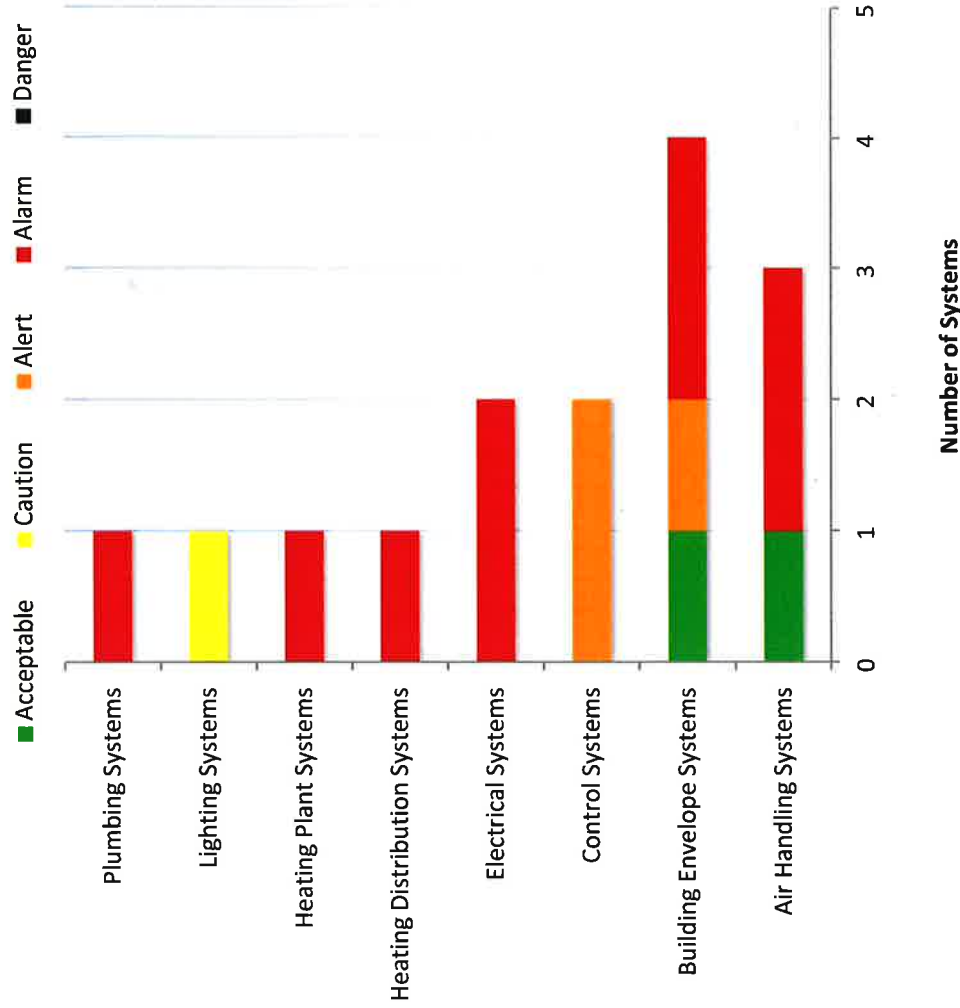
WCA North - Asset Summary

Systems at a Glance



Preliminary

Age-Adjusted Asset Summary

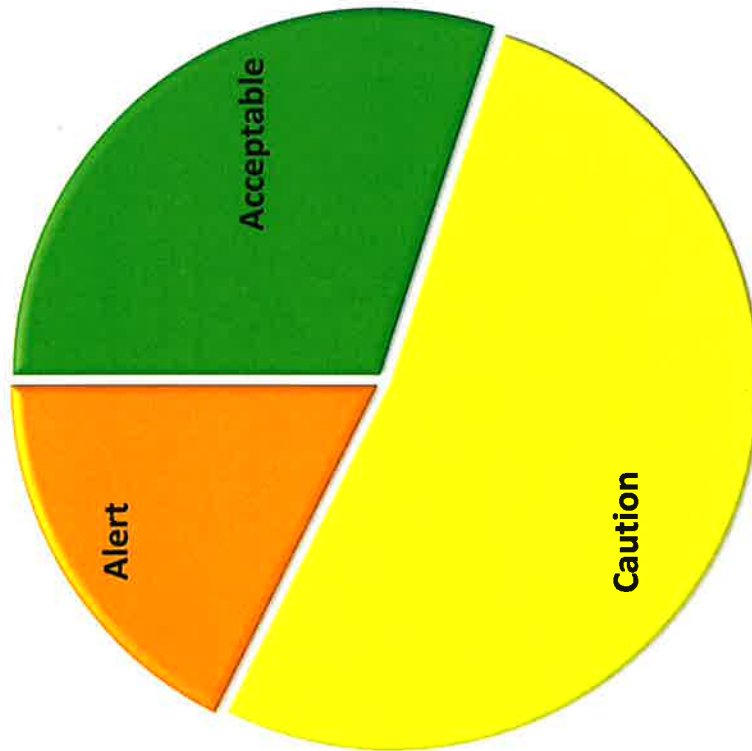


WCA South Elementary – Asset Contrition Assessment

System			Equipment Age and Life Expectancy			Asset Condition Assessment				Current Concerns/Problems										
			Average Life Expectancy	Equipment Installation Date	Actual Age of Equipment	Percent of Life Expectancy Used	Remaining Life	Asset Condition Assessment	Age-Adjusted Asset Condition	Repair/Replace Priority	Energy Efficiency	Ventilation/IAQ	Temperature Levels/Control	Humidity Levels/Control	Light Levels/Type	Reliability/Recent Failure	Code Compliance	Doesn't Meet Educational Needs	Difficult to Maintain	Other Concern / Problem
Preliminary	Boilers -Steam	Heating Plant Systems	Entire Building	30	1954	63	210% (33)	(33)	Caution	Alarm	2	x	x	x	x					Most of the steam and condensate piping is original
	Steam Distribution	Heating Distribution Systems	Entire Building	30	1954	63	210% (33)	(33)	Alert	Alarm	2									
	Unit Ventilators	Air Handling Systems	Classrooms	20	1954	63	315% (43)	(43)	Caution	Alarm	2		x	x	x					
	Rooftop Units	Air Handling Systems	New Secure Office Area	15	2017	0	0% (15)	(15)	Acceptable	Acceptable	5								Secure office area remodel project	
	Electrical Switchgear	Electrical Systems	Entire Building	30	1954	63	210% (33)	(33)	Caution	Alarm	2					x				
	Electrical Distribution	Electrical Systems	Entire Building	30	1954	63	210% (33)	(33)	Caution	Alarm	2	x	x	x	x		x			
	DDC Controls	Control Systems	Entire Building	15	1990	27	180% (12)	(12)	Caution	Alert	3	x	x	x						
	Pneumatic Controls	Control Systems	Entire Building	20	1980	37	185% (17)	(17)	Alert	Alarm	2	x	x	x	x		x			
	Domestic Plumbing Fixtures	Plumbing Systems	Entire Building	30	1954	63	210% (33)	(33)	Acceptable	Alarm	2	x						x		District has begun replacing with LED lighting technology
	Lighting Fixtures	Lighting Systems	Entire Building	20	1990	27	135% (7)	(7)	Acceptable	Caution	4	x				x	x			
Windows	Building Envelope Systems	Entire Building	30	1954	63	210% (33)	(33)	Caution	Alarm	2	x						x			
Doors Exterior	Building Envelope Systems	Entire Building	20	1954	63	315% (43)	(43)	Acceptable	Alarm	2	x						x			
Roofs	Building Envelope Systems	Entire Building	25	2017	0	0% (25)	(25)	Acceptable	Acceptable	5									New in 2017	

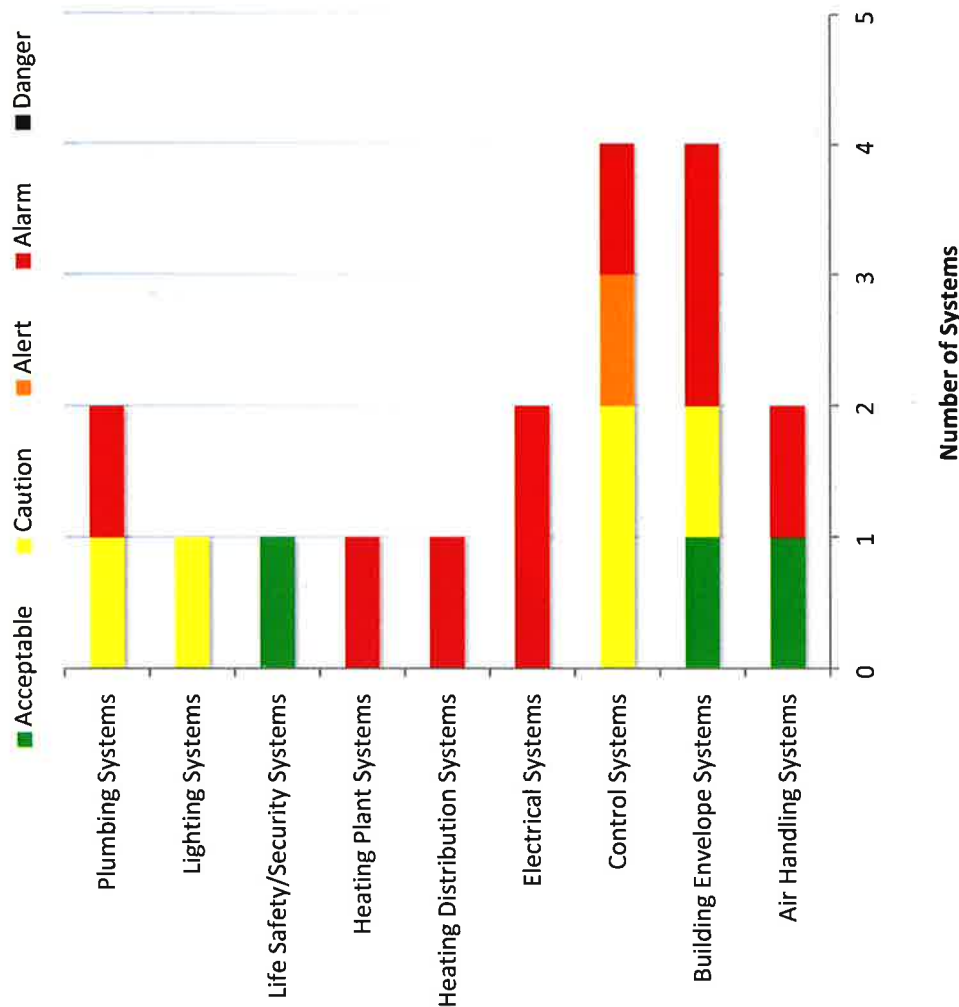
WCA South - Asset Summary

Systems at a Glance



Preliminary

Age-Adjusted Asset Summary



EDUCATION & FUNCTIONAL NEEDS ASSESSMENT

Assessing Other Facility Needs



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

Considering the 21st Century Classroom

Introduction

The more we consider teaching and learning in the 21st Century, the more obvious it is that teaching and learning spaces must change to reflect the paradigm shift we are experiencing.

Many classrooms have improved but too many are designed for the same traditional mode of instruction. Many classrooms are:

- *teacher-centric,*
- *designed for "single-to-many" communication style,*
- *lack flexibility,*
- *poorly designed for collaboration and communication,*
- *have limited support for technology,*
- *rigid in design often unable to be adapted for any other purpose,*
- *individual focused rather than group focused.*



We have seen improvements in the facilities within some classrooms. There are better desks and chairs that are more comfortable and of different sizes to accommodate the physical differences in learners. Classroom walls have spaces to decorate and display student learning. There has also been the introduction of technologies like data projectors, audio and visual systems, and better lighting and light control, but many of these are still implemented in the 20th century mode. Our teaching spaces need to match our 21st century learners and teachers.

Our classrooms must have access to **technology** and **media**. For example, classrooms should be **networked**, adequately provided with a rich Internet connection to support media streams, video conferencing/access grid, and communications. There should be **learning management systems** that support anywhere/anytime learning and assessment.

21ST CENTURY SOLUTIONS

Unesco provides outdated schools with modern technology solutions, flexible classroom designs, and updated security.



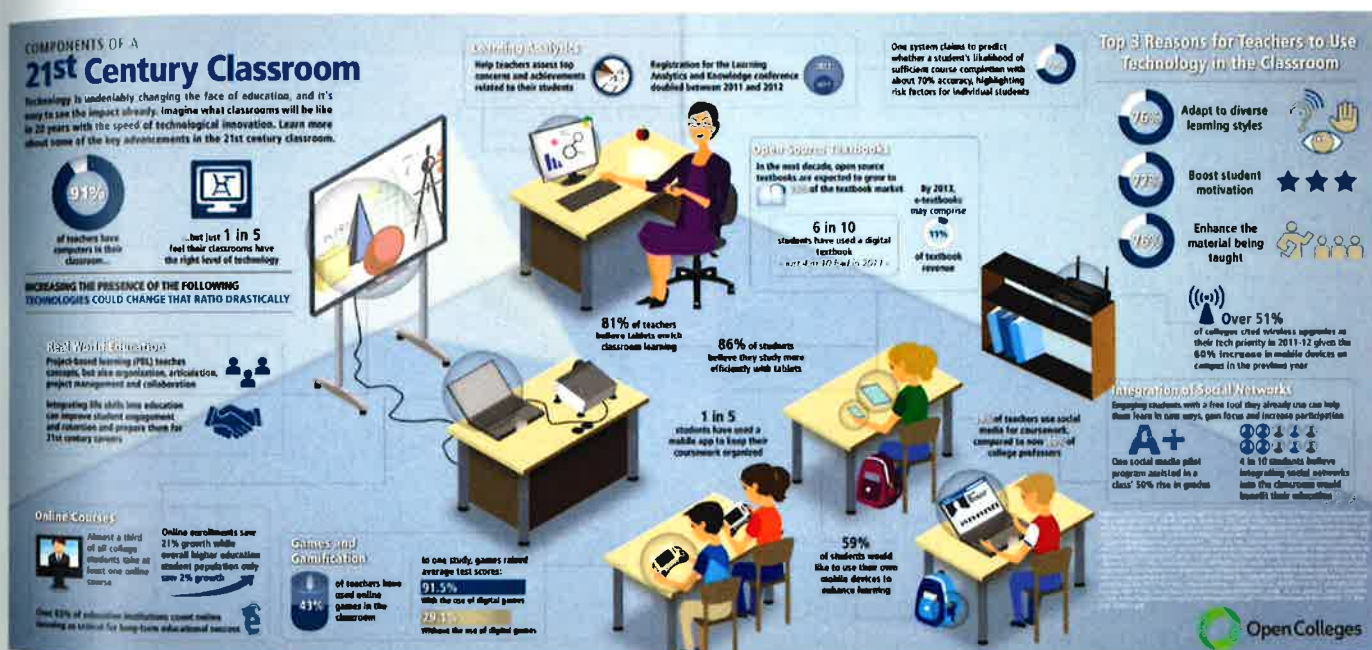
November 20, 2017

West Central Area Schools

Classroom Design

Traditional classrooms are designed for a teacher-centric delivery mode. However, 21st century learners are collaborators and communicators. Therefore, the classroom must be designed to enable group collaboration. It must have the flexibility for furnishings and technology to be rearranged with ease and speed. The rooms must be able to switch rapidly between individual or group format, between presentation, communication, and collaboration modes. Whether as an individual or in small or large groups, learners and educators will be able to connect, collaborate, share, and report - using projection and audio/video conference and web publishing.

Classrooms must be able to adapt to different needs of the learners and the lesson. There needs to be space for students to work quietly and reflectively; space to operate in small groups discussing and debating; space to meet collectively to report, discuss, plan, and teach, as well as space for the class to work collectively.



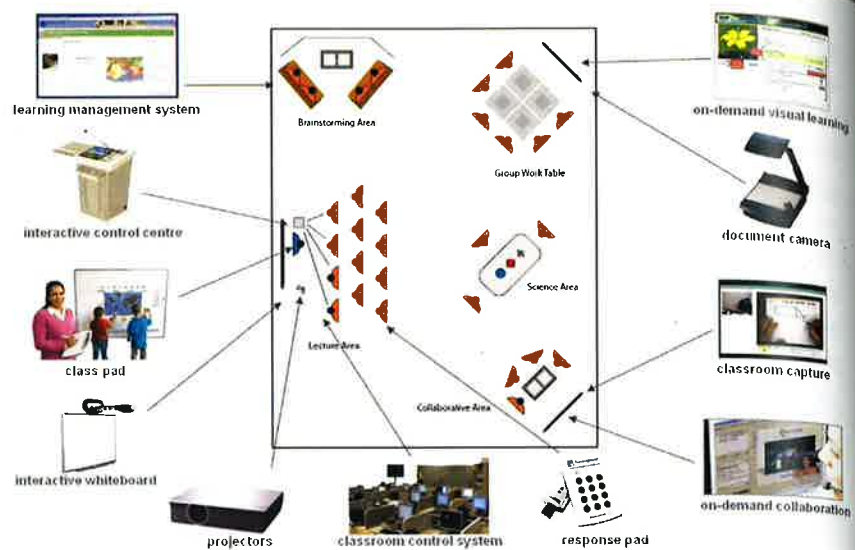
Unesco's Role

- We will continue to research current trends in 21st Century Education, especially as it relates to facility and classroom design and construction.
- We will consider application and cost associated with 21st Century Furniture, Fixtures, and Equipment (FFE) for potential deployment in West Central Area Schools' classroom.

Technology in the Classroom

The rapid advances in technology, linked with reduced costs and increased connectivity, are changing our students, who are learning new things in new ways. For teaching to be relevant, for it to be meaningful, teachers must change and adapt. Our curriculum, our teaching practice, our learning spaces, and our approaches to **technology** all must change in the process.

Educational technology is not a core competency of Unesco; this is an area on which we will rely on our partners to develop a strategic, 21st Century IT/technology plan.



Guiding 21st Century Education Design Principles

Planned Expansion



Plan each school site keeping open possibilities for future expansion and the flexibility to handle changes in the number and characteristic of learners without sacrificing quality of structure or experiences.

Joint-Use Facilities



Explore the possibility at each site of creating facilities that will be jointly used, operated and funded by the district and another organization e.g. City, YMCA, areas of worship.

November 20, 2017

West Central Area Schools

General Learning Space



Allow for a variety of learning experiences that promote personalized learning. Finishes and furniture are designed to promote collaborative, creative, and personalized learning. General Learning Spaces will be sized for variable teaching layouts, technology, and individual or group arrangements.

Varied Space



Provide a variety of sizes and layouts of learning space for different teaching and learning styles. Each school should have a variety of spaces to serve different purposes and group sizes, and that can be arranged in a variety of ways.

Student Gathering Space



A student's social development is part of his or her education and growth. The school facility will provide formal and informal spaces for class groups and students to gather, and to interact and study in safe, manageable forums.

Assembly Space



Each school will have a space which allows gathering of the entire population of students and staff, thereby supporting and strengthening school community spirit. Design for multiple uses (e.g. a gym used for speakers and events as well as games).

Interdisciplinary Learning



The school organization and its individual spaces will be designed to allow interdisciplinary and collaborative learning, and strengthen natural connections between subject areas. Learning Spaces grouped with other facilities allow teachers of different subjects to collaborate with an identified group of students.

Specialized Lab/Studio Space



Each school will have specialized lab/studio spaces for programs whose needs cannot be provided in a General Learning Space. All labs/studios will be designed with adaptability and flexibility in mind, so that site-based decisions about yearly program offerings are supported, and so that the spaces may be utilized by students and community.

Shared Space



Shared use of learning spaces, labs, activity areas, and grounds to support programs including electives to Community Education and after school youth care. Some programs share facilities during the day with PK-12 programs.

Specialized Services Space



Provide space in each facility to support all students with special needs. Space is needed both to facilitate inclusion within the classroom and for special services in specific settings. Design an atmosphere conducive to learning, in or near other learning spaces, to meet the student's special physical, sensory, and emotional needs.

PK, K, Early Childhood



Provide facilities that address the specific needs of young learners, with adequate support space.

Personalized Learning Space



Design facilities that support efforts to personalize learning for all students. Recognize learner needs for places that allow them to take initiative and explore their interest, and for a place they can make their own.

Staff Resource Space



Provide staff space that will encourage collaboration, support interdisciplinary teaching and teaming and reduce staff isolation. Adequate and functional space for teachers to meet, plan and work are essential to successful educational service. Locate work/planning spaces to allow natural connections between students and staff.

Space for Enriching Activities



Because participation in co-curricular and extracurricular activities enhances the personal development and wellness of the participants, facilities with adequate space will be provided to support these activities. Activities include athletics, visual and performing arts, and student activities, such as publications and clubs.

Food Service and Dining



Food Service areas will include space for efficient production and serving of nutritious, healthy food. In addition, they should be designed to be appealing to students and others in the buildings.

Technology Space



Incorporate space for current and future technology infrastructure and equipment into the design of buildings, with space for student/staff/community use.

Storage Space



Provide dedicated interior storage space at each school, designed for large and small items. In addition, locate enclosed storage convenient to activity fields and/or paved areas for maintenance and play equipment.

Safe/Accessible Outdoor Play



Physical activity is a key part of a healthy school experience, therefore playgrounds and playground equipment, playing fields and athletic fields should be available for student use during and after school. Safety, security, accessibility will be considered.

Clear Main Entry



Create a clear, identifiable main entry with direct access to the main office. If students do not use this entry when they take buses, student entry to be identifiable and welcoming.

Welcoming Main Office

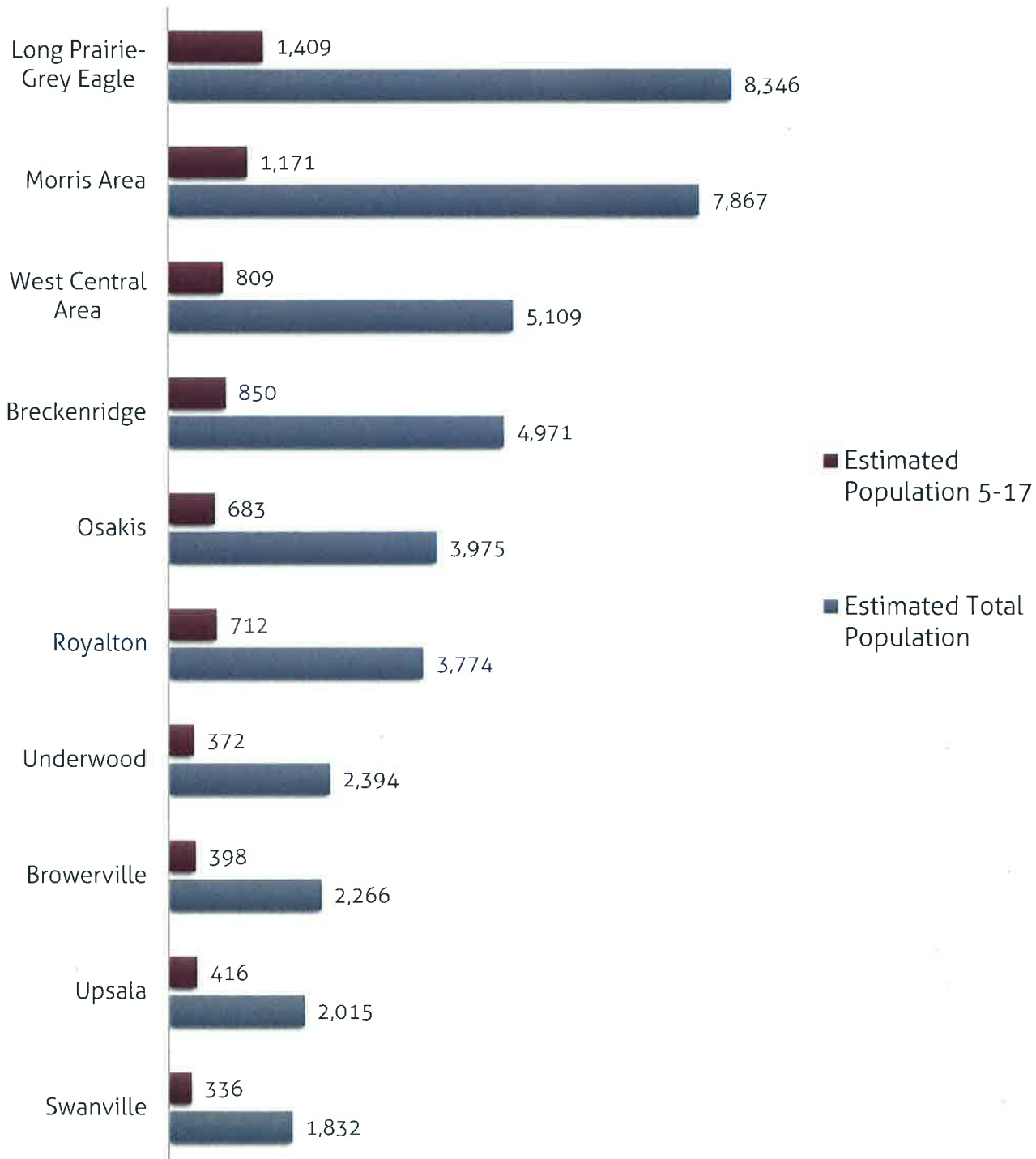


The administration and reception functions of each school will be housed in pleasant, respectful, comfortable spaces to welcome visitors and the public, as well as the school's students and staff.

Population Trends

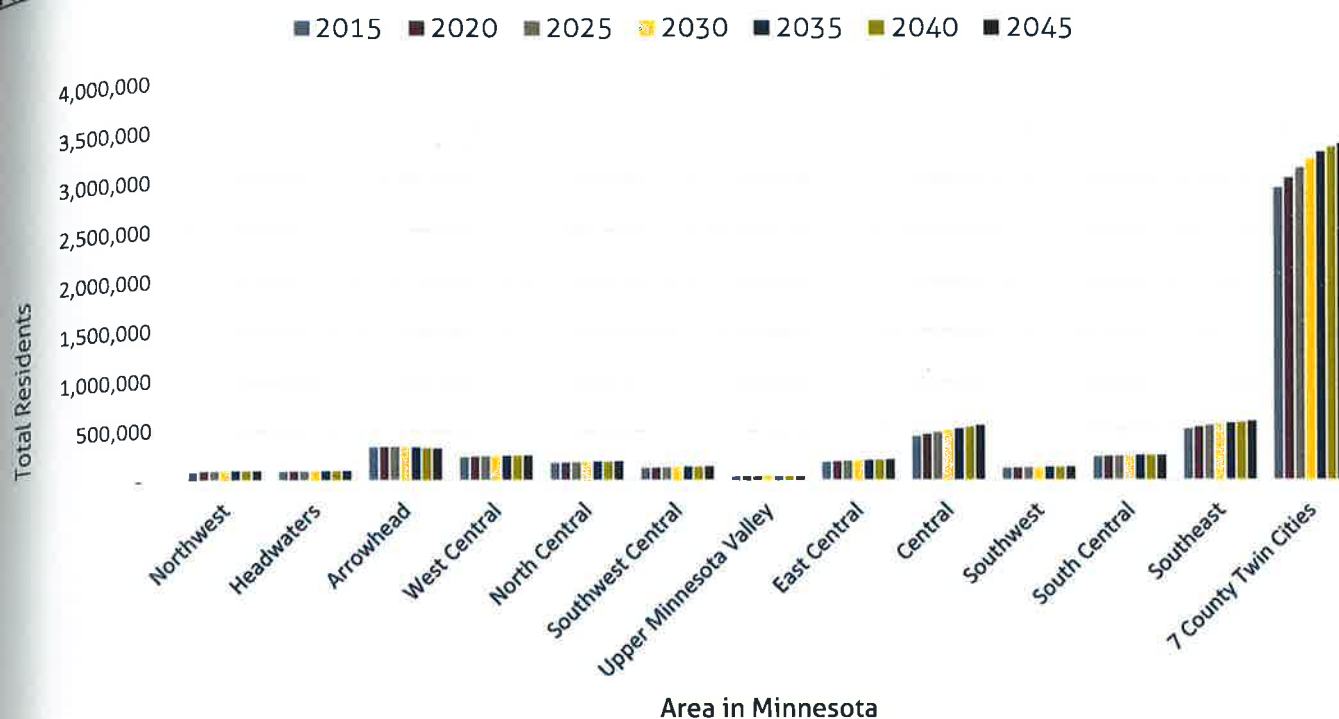
District Population⁵

2013 Population Serviced by Area School Districts

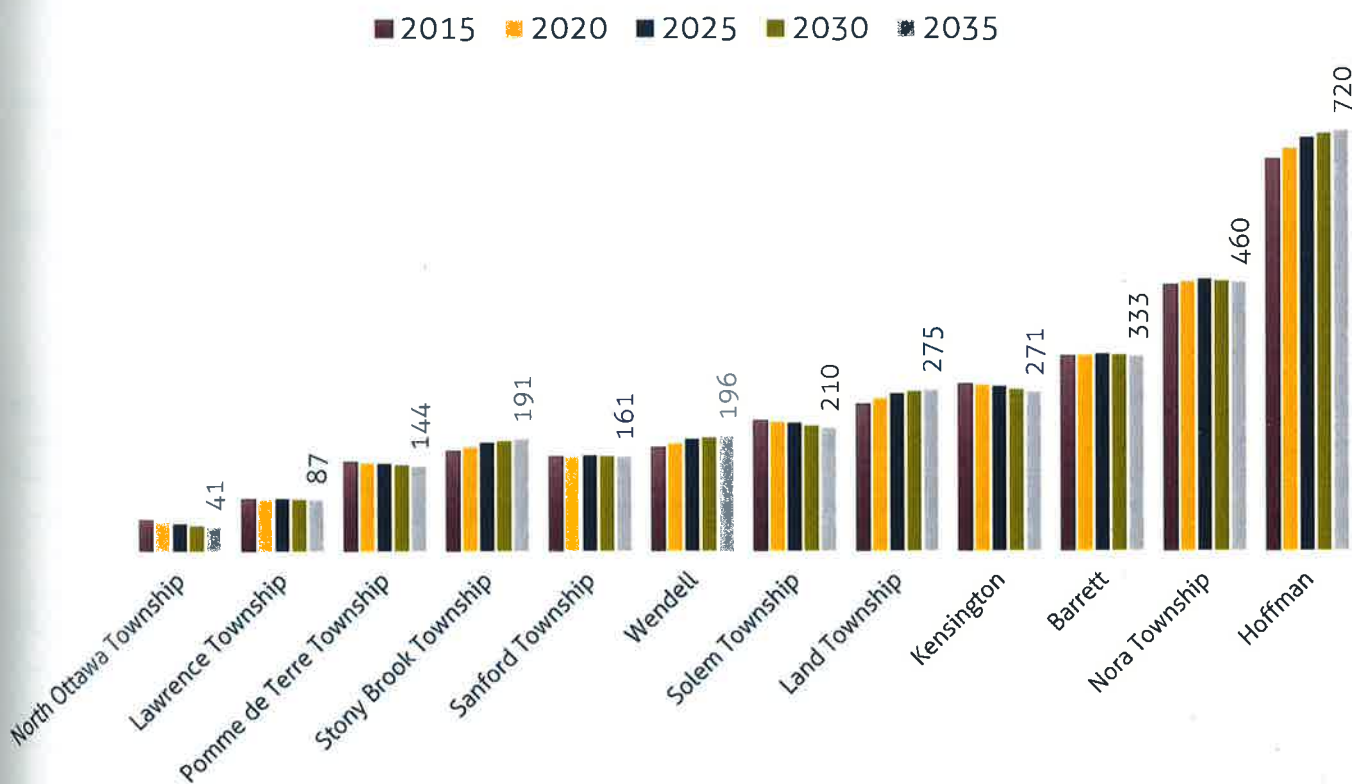


⁵ Source: U.S. Census Bureau, 2013 Small Area Income and Poverty Program; Released December 2014

Minnesota Regional Population Projections⁶



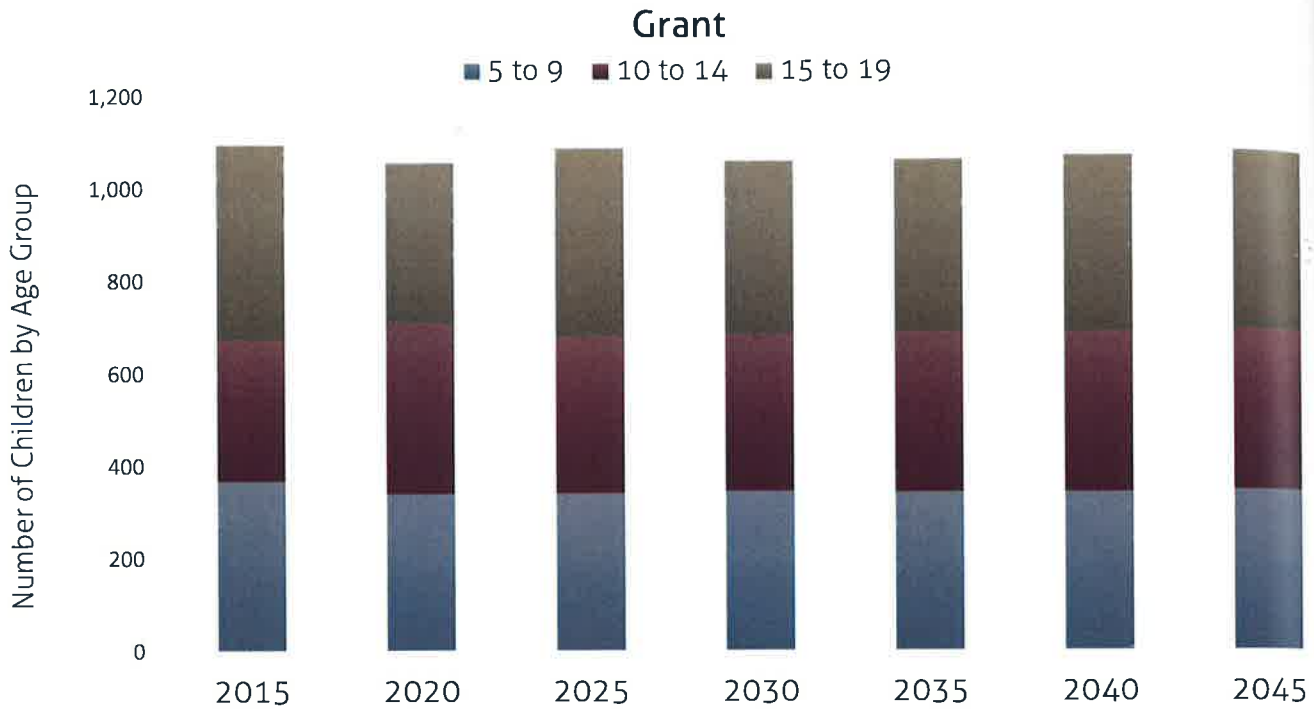
Area Population Projections⁷



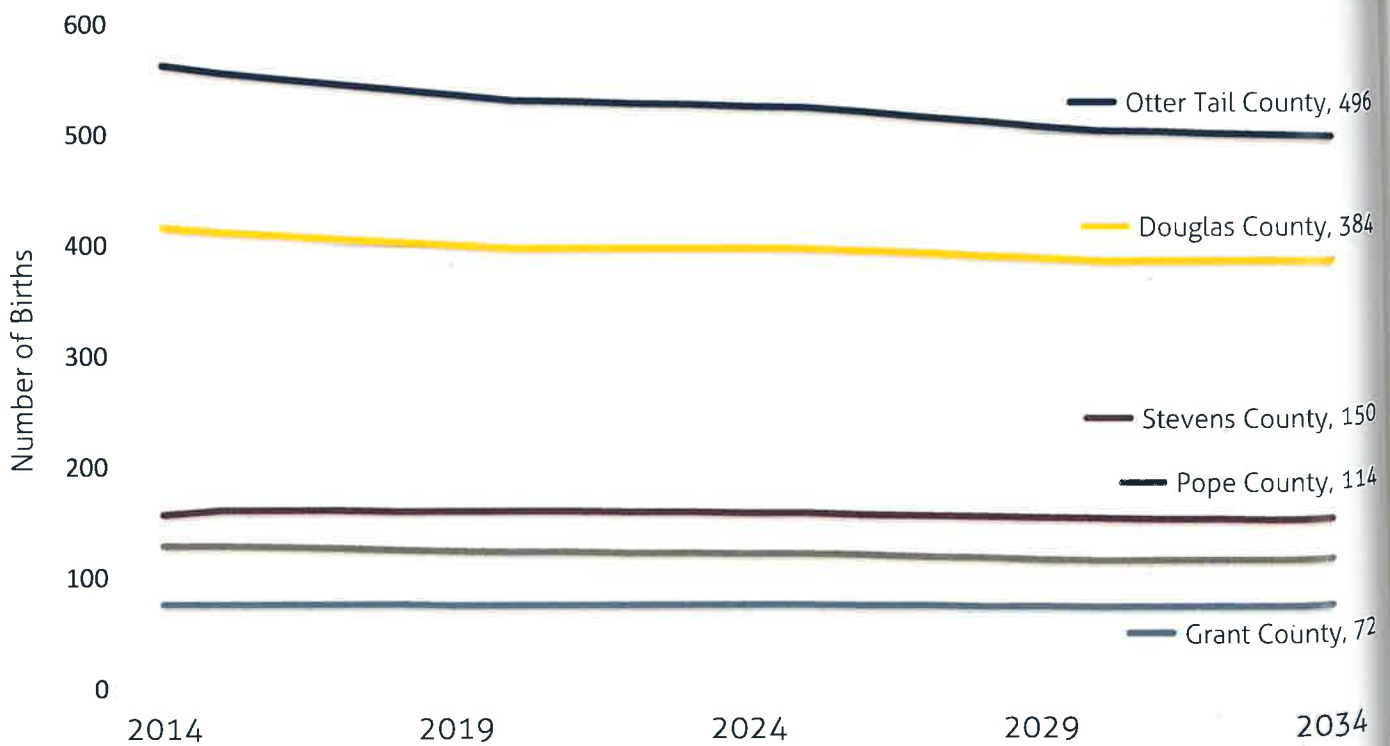
⁶ Source: Minnesota State Demographic Center, March 2014; "Minnesota County Population Projections by Age and Gender, 2015-2045"

⁷ Source: Minnesota State Demographic Center, October 2007

County-Wide Population Projections – School Age Children⁸



Projected Births⁹

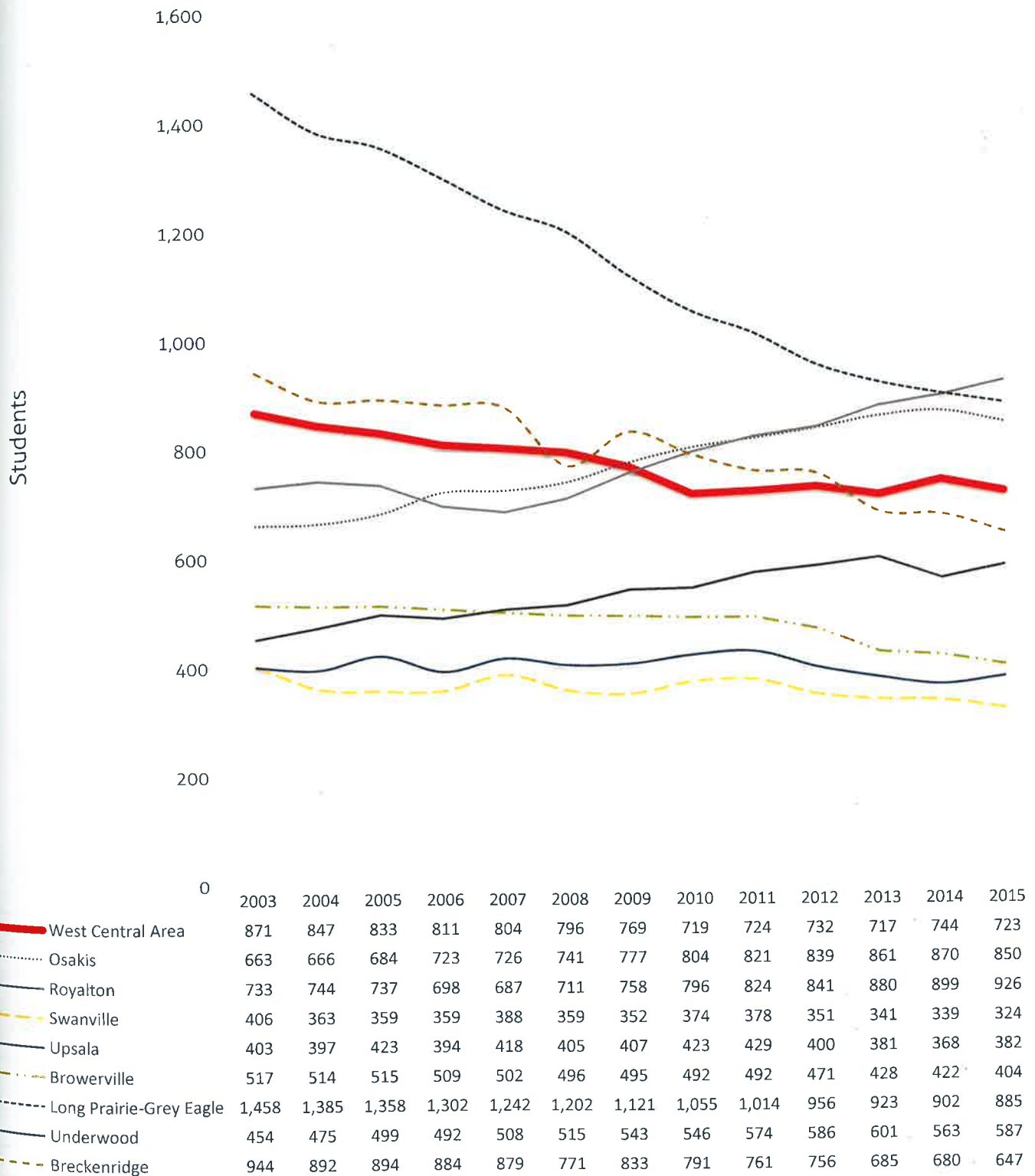


⁸ Source: Minnesota State Demographic Center, March 2014; "Minnesota County Population Projections by Age and Gender, 2015-2045"

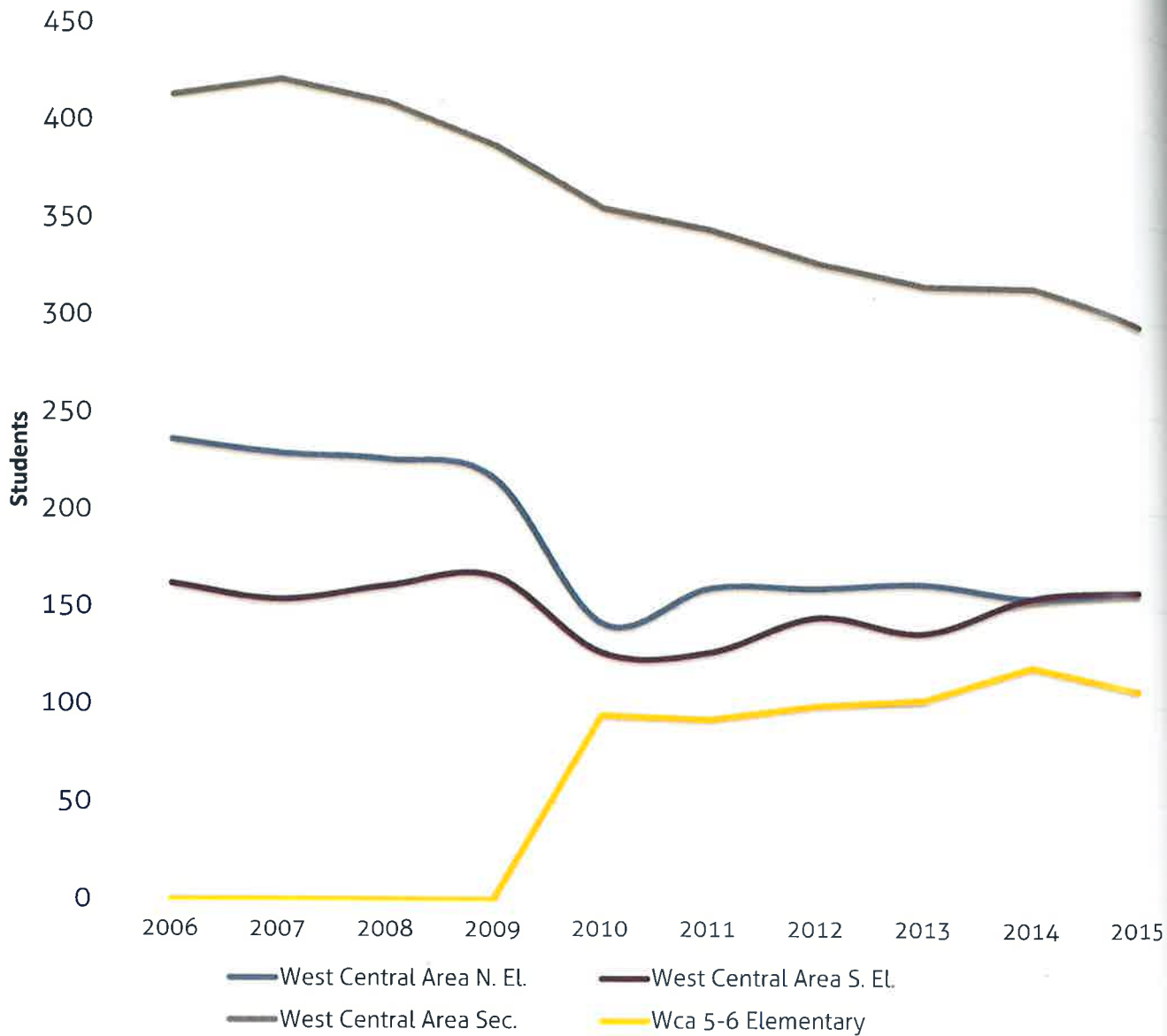
⁹ Source: Minnesota State Demographic Center, October 2007

Enrollment Trends¹⁰

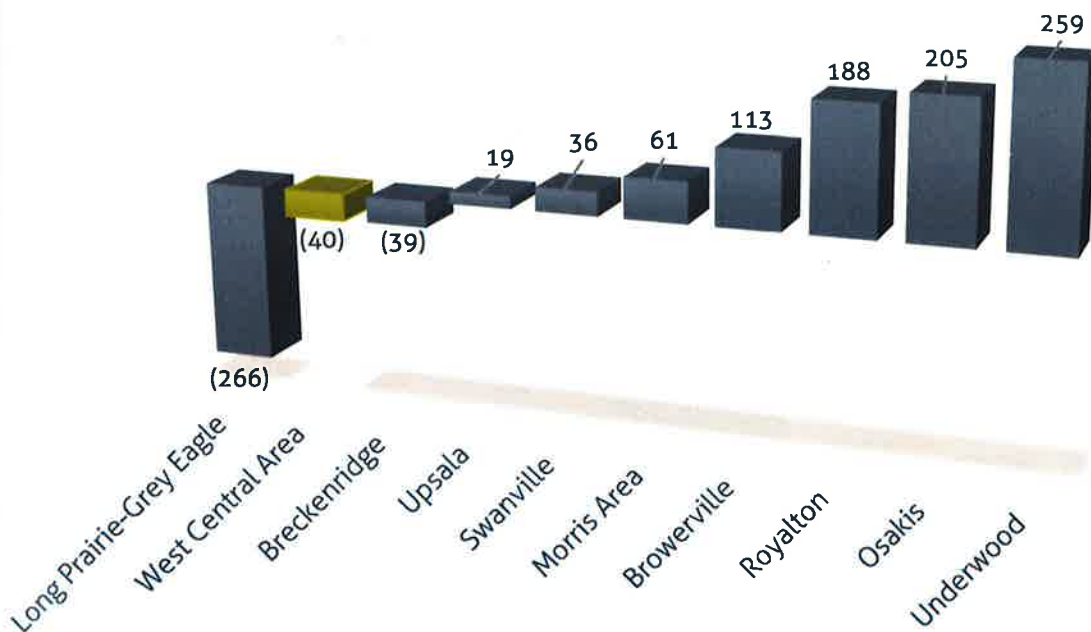
Enrollment Over Time

¹⁰ Source: Minnesota Department of Education

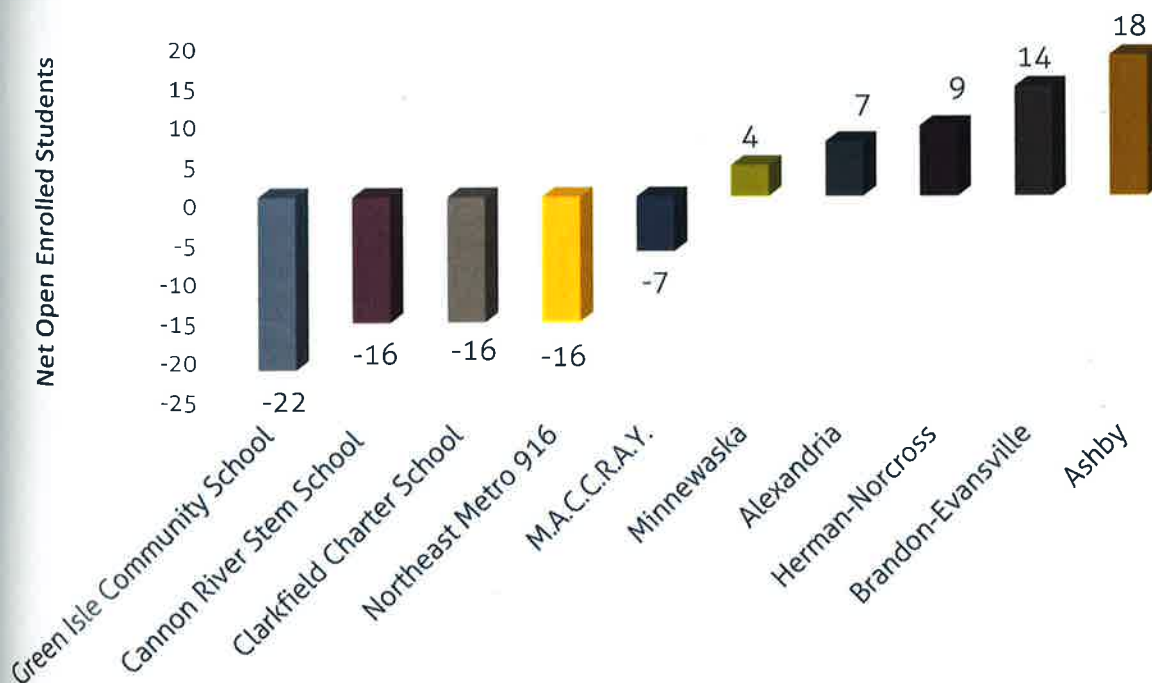
Enrollment by School



2015-16 Net Open Enrollment

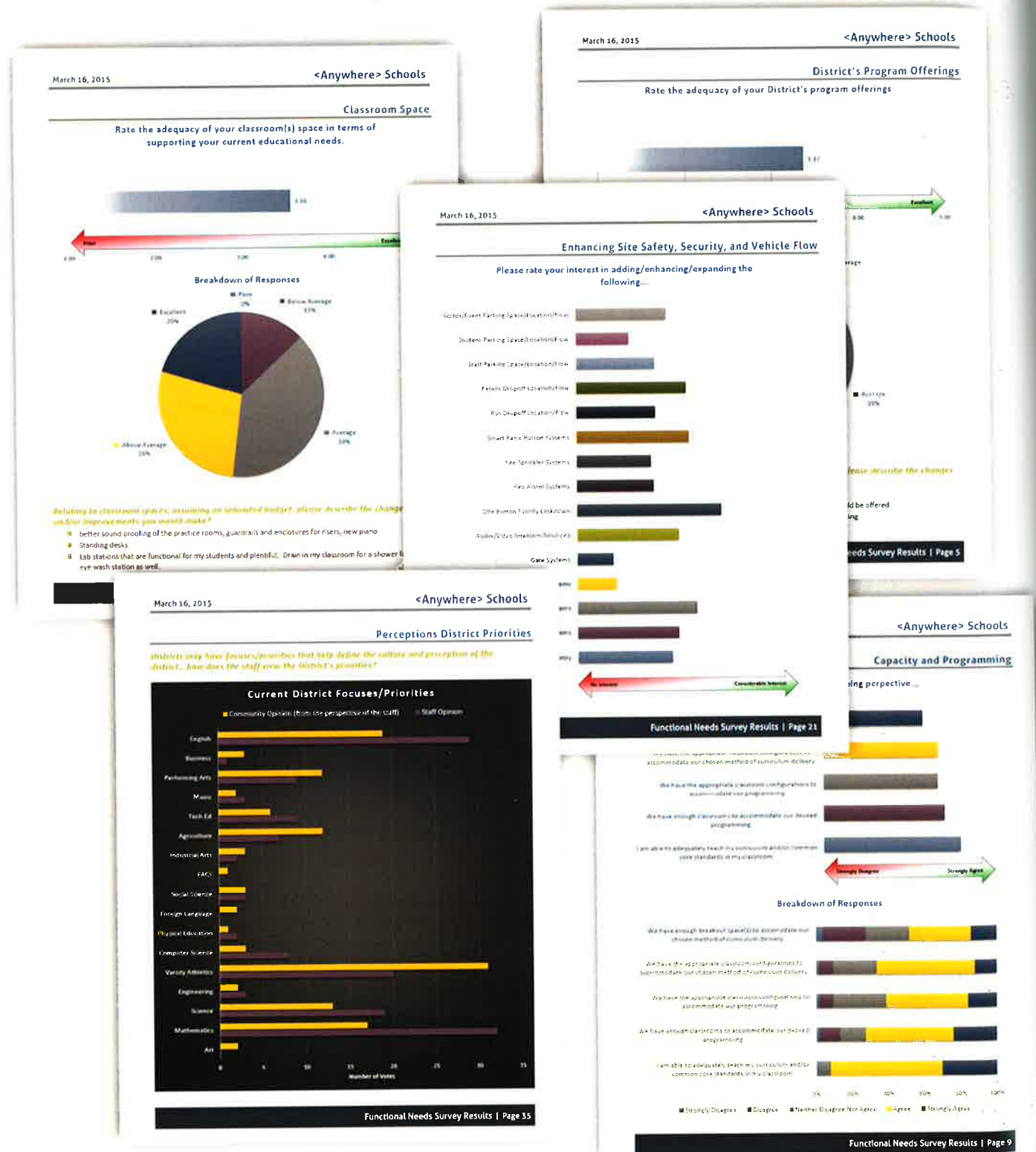


Where Does West Central Area Schools Gain/Lose Students?



Functional Needs Survey Results (to be completed)

To better understand education and functional facility needs, we often survey staff and other stakeholders. What follows are example results from other districts with whom we have worked.



PRELIMINARY IDEAS AND OPPORTUNITIES

Potential Facility Improvement Measures



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

This section summarizes the notes and photos taken during the walkthrough of the West Central Area Schools' facilities and conversations with multiple school personnel. With the assistance of school personnel, we conducted an engineering walkthrough on August 28th, 2017.

The West Central Area Schools' facilities possess significant potential for energy and operational savings improvements and need some non-saving upgrades and enhancements. Detailed explanations of the existing conditions along with specific recommendations are provided on the following pages.

Facility Improvement Measures Code Definition

Each Facility Improvement Measure (FIM) has a code number that has been developed specifically for this project. The **uppercase letter** represents the **category** of facility deficiency / opportunity:

A	Accessibility
C	Energy Management and Controls
E	Electrical Systems
EQUIP	Capital Equipment/Assets
EXT	Exterior Envelope Including Roofing
G	Grounds, Site, and Surroundings
HAZ	Hazardous Materials
INT	Interior Spaces and Finishes
LS	Life Safety Systems
M	Mechanical Systems
P	Plumbing Systems
PROG	Facility Programmatic / Educational Adequacy Enhancements
S	Electronic Security Systems
T	Technology Systems - Non-Instructional
U	Utility Service Improvements
V	Ventilation / Dehumidification Systems

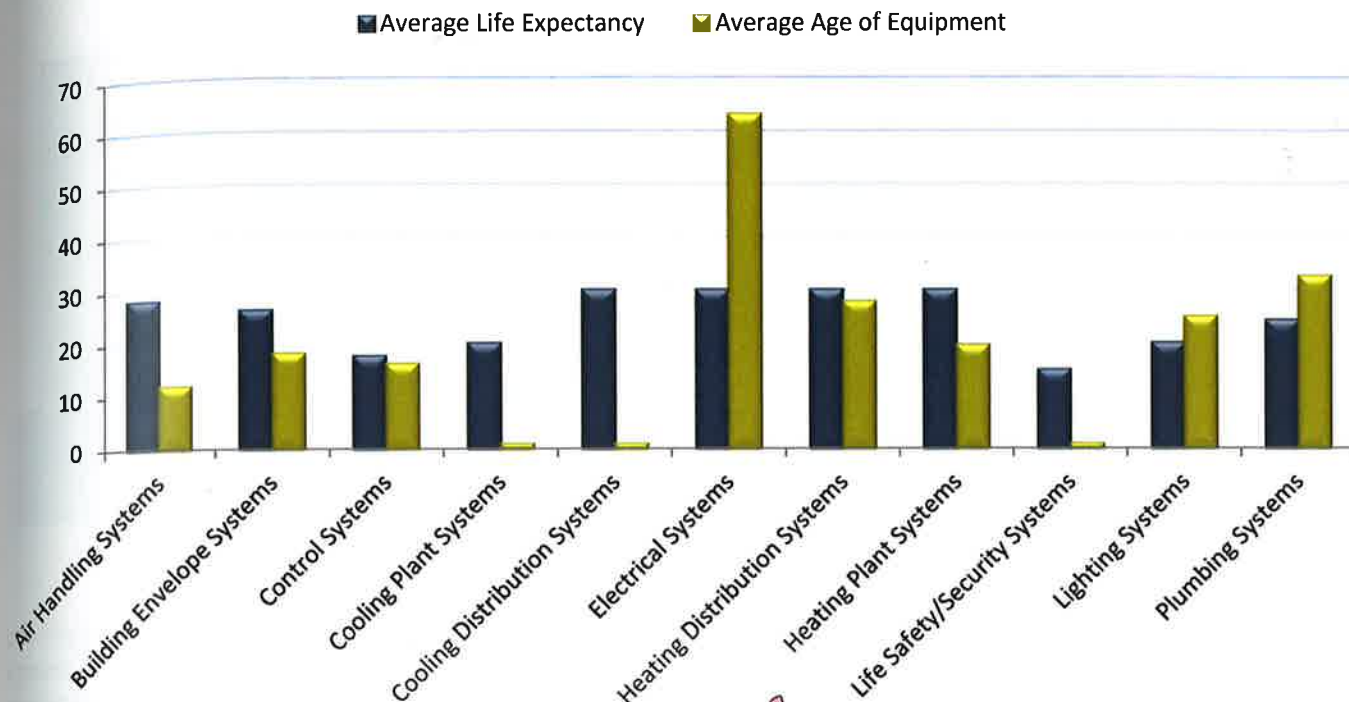
The **number** represents the **sequential order** of that particular FIM type.

C.1a

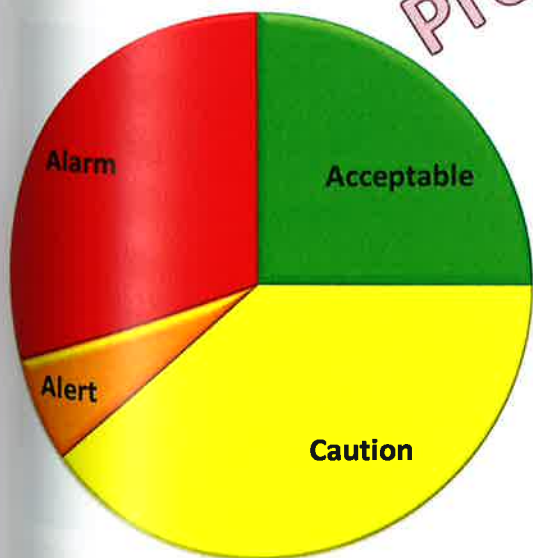
The **lowercase letter** represents the sequential order of that particular FIM type **option**.

All Buildings Overall – Asset Condition Assessment

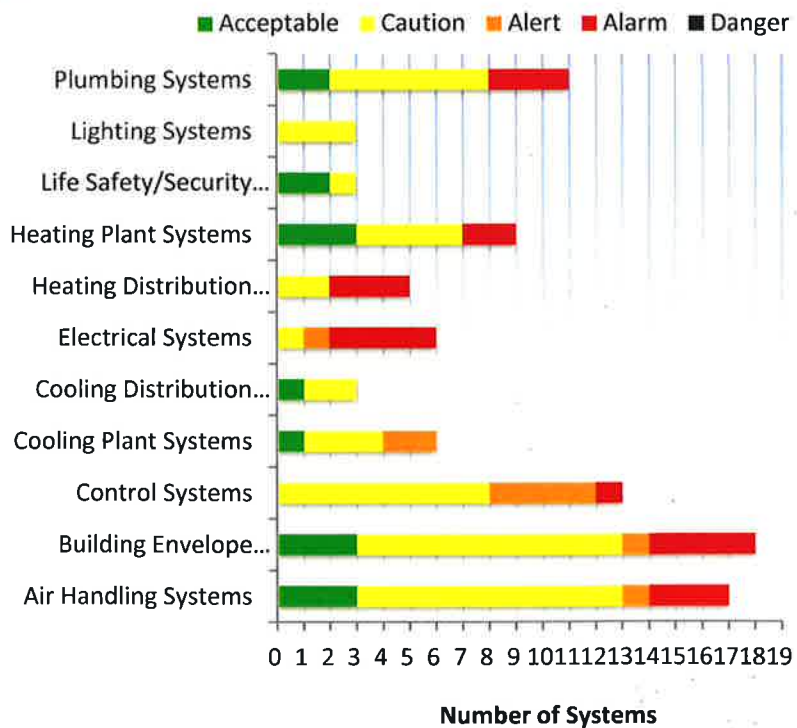
System Age Summary



Systems at a Glance



Age-Adjusted Asset Summary



Energy Management and Controls

C.1a Energy Management and DDC

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Expand the existing DDC systems...



...for better control throughout the district

Ideas / Opportunities

It is recommended to recommission and expand the existing Digital Control Systems with the Energy Management System (EMS) to provide state-of-the-art control strategies and to optimize system performance. Energy management strategies will be recommissioned and expanded for each system, including programmed optimal start/stop of HVAC systems, improved sequencing of heating, cooling, and damper control, monitoring of system control parameters, building day/night setback control, etc. We would replace the older pneumatic and electric control valve and damper actuators with new DDC control hardware.

C.1b Replace Existing and Install/Expand New DDC Controls

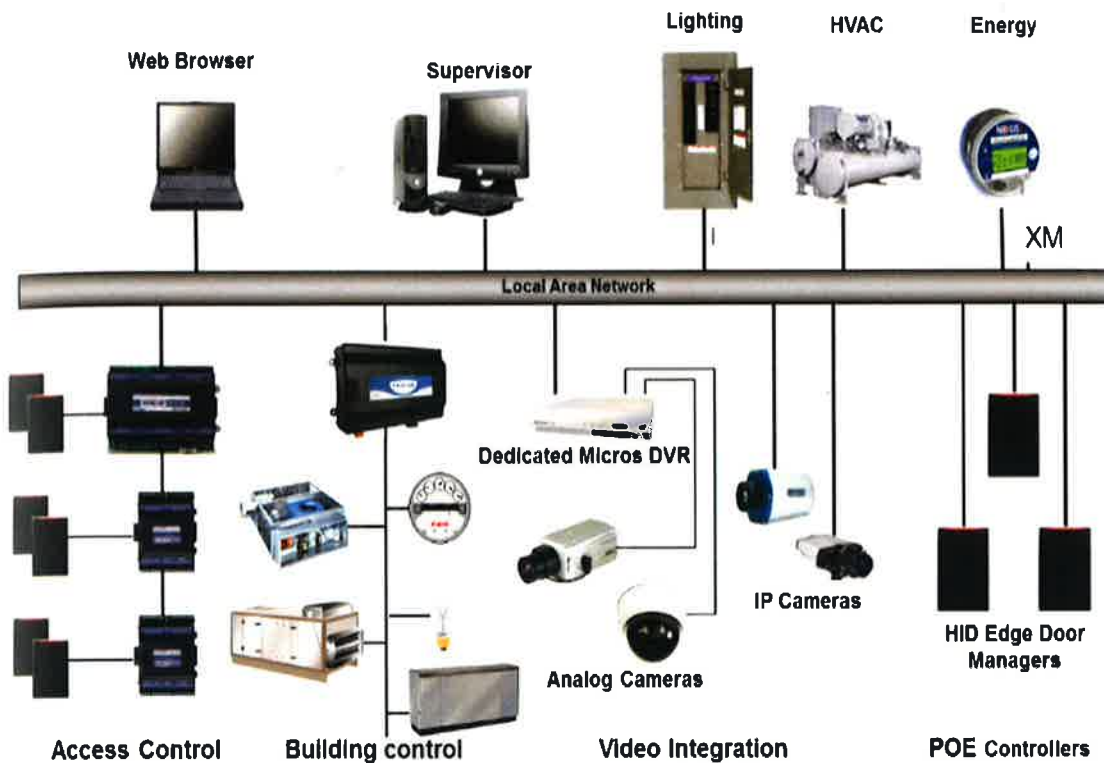
☒ High School/Middle School ☒ North Elementary ☒ South Elementary



New controls will provide advanced graphics and control strategies...



...with web-based control and monitoring.



Option to fully integrate new controls to automate additional building systems.

C.2 Recommission Existing Pneumatic and Electric Controls

☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Recommission existing electric controls.



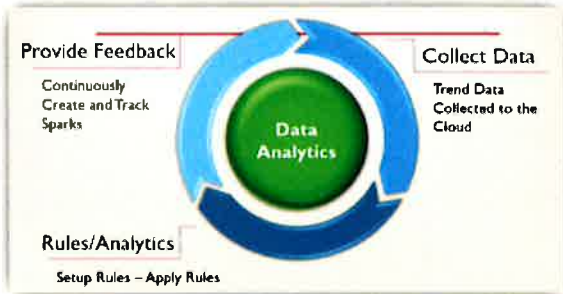
Recommission existing pneumatic controls.

Ideas / Opportunities

Recommission pneumatic and electric controls used on room-level and central HVAC equipment. Recalibrate thermostats to optimize occupied and unoccupied space temperature setpoints and repair or replace any malfunctioning pneumatic and electric actuating devices.

C.3 Control System Data Analytics

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Data analytics save energy and...



...monitoring ensures savings are sustainable.

Ideas / Opportunities

Data analytics help identify energy saving strategies by data quickly and finding operational anomalies and recurring issues. Data analytics can utilize data from existing BAS to find issues and opportunities for savings and calculate savings without requiring the implementation of additional hardware and software temporary data logging. Applying data analytics by Unesco for ongoing, monitoring-based commissioning insures that savings will be maintained.

E.1a Lighting Retrofit with New LED Technology

☒ High School/Middle School ☒ North Elementary ☒ South Elementary

Existing Conditions

Most of the lighting systems in the facilities are fluorescent fixtures utilizing electronic ballasts and standard 32-watt T-8 lamps. There are many 3 and 4-lamp, 2 x 4 fluorescent fixtures throughout the buildings. Exterior building lighting is a combination of LED and HID fixtures.



Retrofit T-8 lamps...



...with new LED technology.

Ideas / Opportunities

There is an excellent opportunity to both improve the quality of lighting as well as significantly reduce the energy and maintenance costs associated with the lighting systems. Our general approach is to install a new high-performance lighting system and reengineer light levels to recommended levels, to provide the appropriate light levels for each space, in the most energy efficient manner. We recommend going to a 5000K or higher lighting system, which is a whiter color lighting that is closer to day lighting. The human eye perceives a higher color temperature lighting system as brighter allowing us to reduce light levels, while maintaining appropriate brightness. Studies have also shown an increase in alertness, concentration, and test scores when students are in an environment with lighting that is closer to daylighting (6500k). We recommend the use of LED tubes, LED kits and/or new LED fixtures to provide a high-performance lighting system. As part of the lighting retrofit we will utilize de-lamping and installation of high performance reflectors, as much as practical, to achieve the recommended post retrofit light levels.



Efficient

- Roughly 50% reduction in lighting system operating cost
- Cool - LEDs produce a fraction of the wasted heat, thereby reducing air conditioning load and energy costs.



Reduced Maintenance

- Can eliminate ballasts – one less thing to stock and maintain/replace
- Redirect employees to other activities



Durability

- No filament or glass bulb; not damaged when other bulbs/lamps would be broken
- Excellent cold-weather performance



Environmental Leadership

- Millions of kWhs saved per year and thousands of tons of CO₂ emissions eliminated
- Mercury-free; mercury containing fluorescent lamps eliminated



Long-Lasting

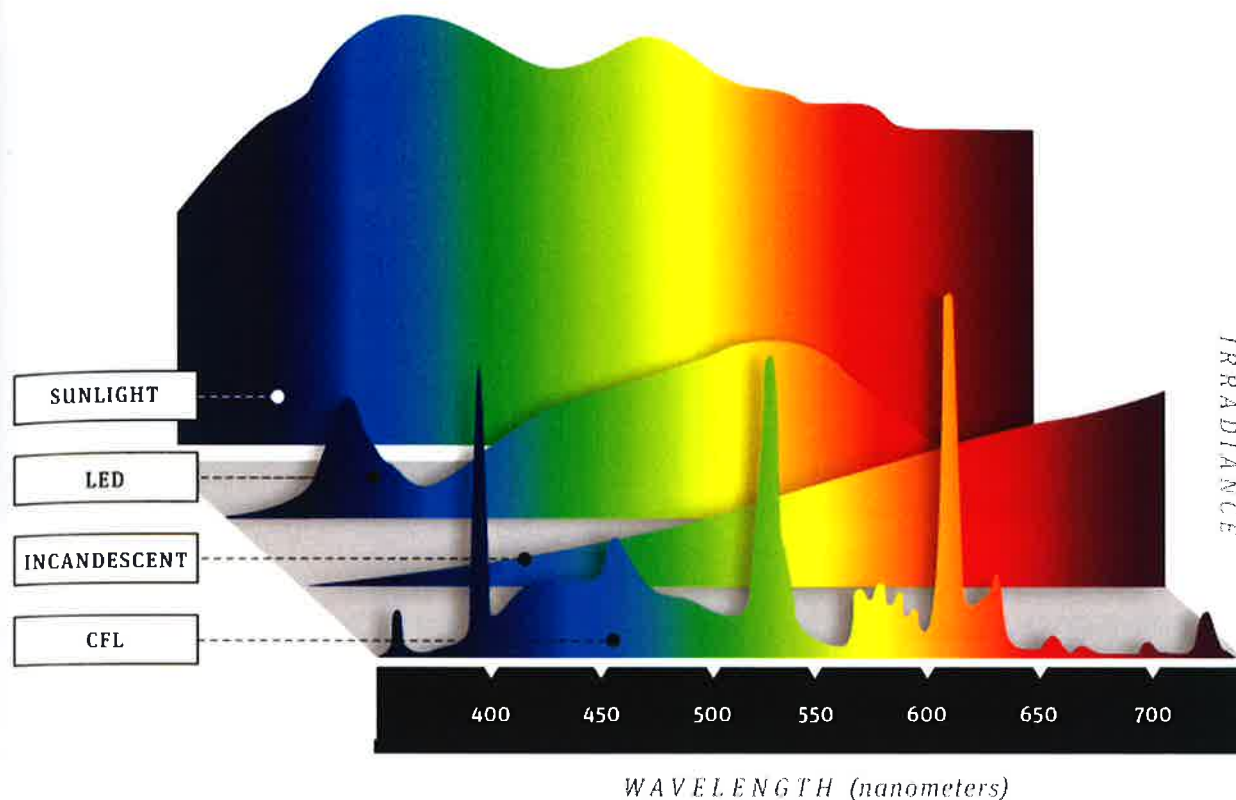
- New LED lamps have a 100,000 hour average
- Lights don't burn out; illumination merely degrades



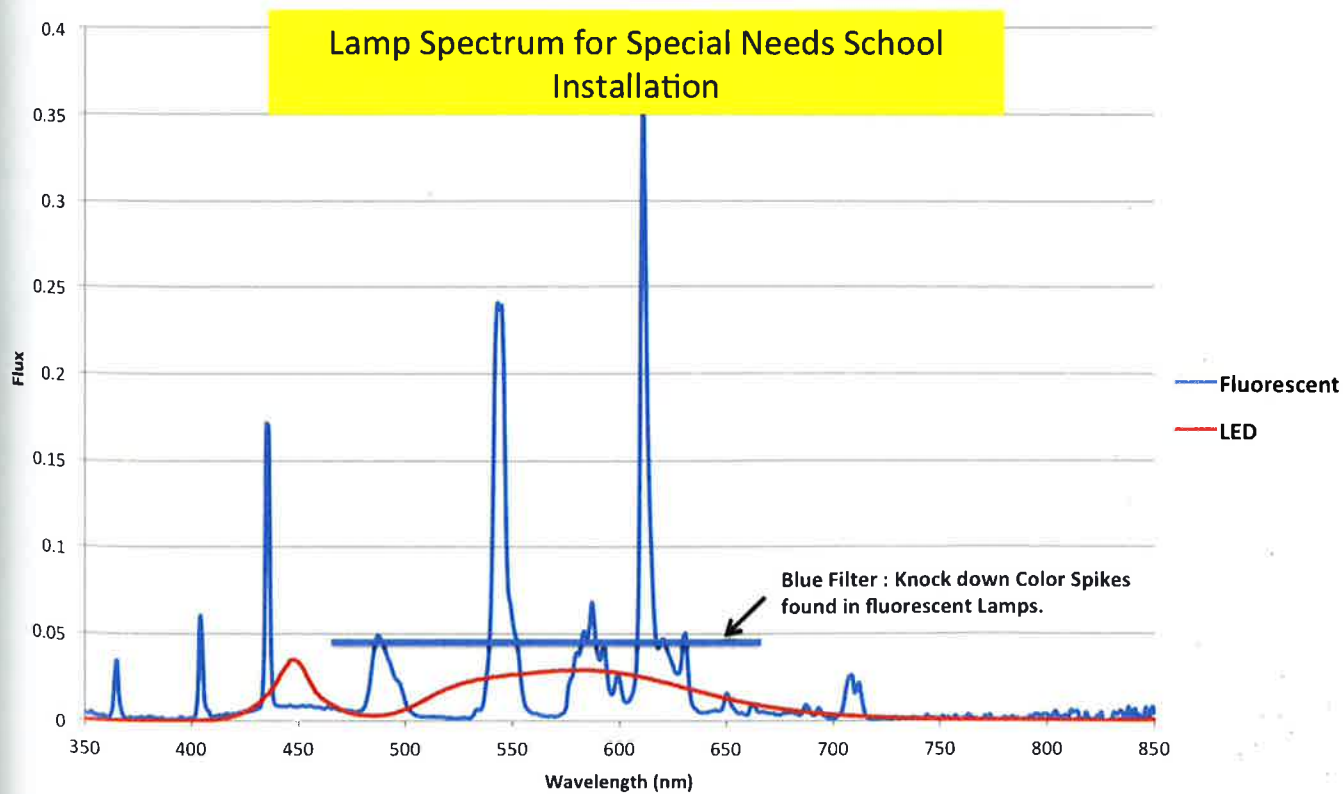
Improved Learning Environment

- No flickering or **strobing** lights, no buzzing ballasts; especially important in K-12 SPED settings
- Improved visual environment and color clarity

LED Lights are the Best Spectral Match to the Sun



LED Lights Do Not Strobe or Spike



E.1b Lighting Retrofit with Some Fixture Replacement

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Replace old inefficient interior fixtures...



...with new LED fixtures (stock photo).

Ideas / Opportunities

Some light fixtures in the facilities have exceeded their rated lifespan and should be replaced. Opportunities exist to upgrade older and inefficient lighting fixtures with new fixtures to improve light levels and uniformity.



Re

Ideas / Opportunities

Building
LED light
life and

November 20, 2017

E.2 Exterior Lighting

☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Replace outdated HID wall pack exterior lighting...



...with new LED technology fixtures



Replace HID entrance fixtures.

Ideas / Opportunities

Building exterior, walkway, and parking lot lighting fixtures should be upgraded to longer lasting, energy efficient LED lighting fixtures. The fixtures can be controlled to ensure non-operation during daylight hours wasting lamp life and energy.

E.3 Lighting Controls

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Install occupancy sensors to control lights in areas such as gyms...



...and classrooms that have varying occupancy

Ideas / Opportunities

There are opportunities for installing lighting controls in various areas of the buildings that have intermittent occupancy and the lighting systems in those areas would be shut off automatically when the spaces are unoccupied. Actions have been taken to do this in the high school gym and should be done throughout the rest of the district.

- Add occupancy sensors for areas with intermittent occupancy (classrooms, meeting rooms, etc.).
- Provide daylighting controls for areas that have considerable exposure to natural light.

E.4 High Efficiency Electric Motors

☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Upgrade existing outdated motors in the elementary schools to new high-efficiency motors.

Ideas / Opportunities

Replace older standard efficiency electric motors throughout the facilities for circulating pumps, air handling unit fans, etc. with new energy saving high efficiency electric motors. This reduces energy use and extends the life of the equipment.

E.5 Variable Speed Drives

- ☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Install variable speed drives on air handling units...



...serving large variable occupancy areas

Ideas / Opportunities

Install variable speed drives (VSDs) and controls for the existing air handling units and pumps to improve system performance and operational efficiency.

E.6 Upgrade Older Electrical Panels

- ☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Upgrade existing dated electrical distribution systems...



... and electrical panels/disconnects

Ideas / Opportunities

Upgrade the electrical distribution system in the facilities to meet NEC standards, present needs and anticipated future electrical needs. Electrical distribution system upgrades include replacement and expansion of electrical circuit wiring, outlets, switches, circuit breakers, distribution panels, and sub-panels necessary to support the technologies of 21st century educational programming.

EQUIP.1 Locker Replacement

- ☒ High School/Middle School ☐ North Elementary ☐ South Elementary



Lockers in Poor Condition

Ideas / Opportunities

It was mentioned that the lockers present in the middle/high school were in poor condition and should be replaced.

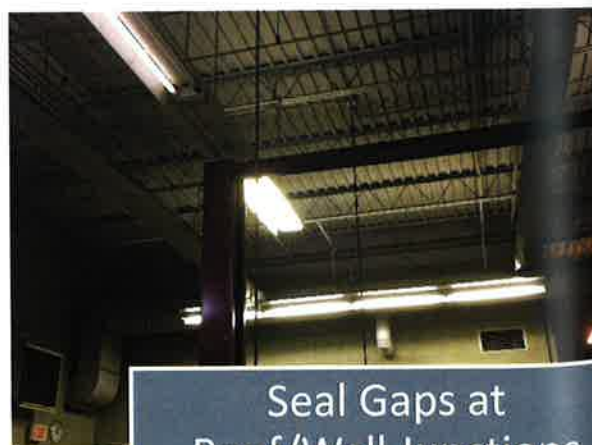
Exterior Envelope

EXT.1 Seal Building Envelope to Minimize Air Leakage

- ☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Replace door seals and weather-stripping.



Seal Gaps at Roof/Wall Junctions

Ideas / Opportunities

Weather-strip exterior doors with high quality commercial grade weather-stripping materials, re-caulking and sealing windows and frames, and sealing gaps at roof/wall junctions and roof level changes with fire retardant 2-part polyurethane foam.

Re-caulk expansion joints, mortar joint and exterior brick repairs. Building surfaces will be cleaned, patched, and painted.

nt/Asset
XT.2 Window Replacement

☒ High School/Middle School

☒ North Elementary

☒ South Elementary



Windows appear to be original construction and have exceeded their useful life.



Others windows are damaged/degraded and should be replaced.

ideas / Opportunities

Replace the inefficient windows with high efficiency windows. This will raise occupant comfort and increase the efficiency of the building envelope for energy savings.

ould be replac

Envelo
KT.3 Replace Older Exterior Doors

☒ High School/Middle School

☒ North Elementary

☒ South Elementary



Some exterior doors are suffering from oxidation...



...and general wear and tear.

at
ctions

re-caulking
fire retardant

ed, patched,

EXT.4 Water Intrusion Issues

☒ High School/Middle School ☐ North Elementary ☐ South Elementary



Signs of water intrusion is present...



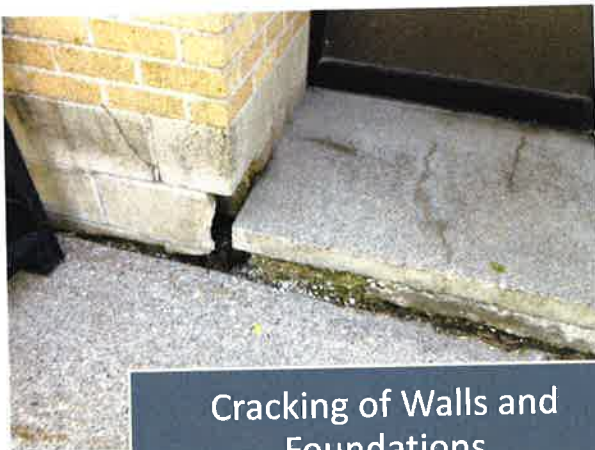
...at many of the skylights.

Ideas / Opportunities

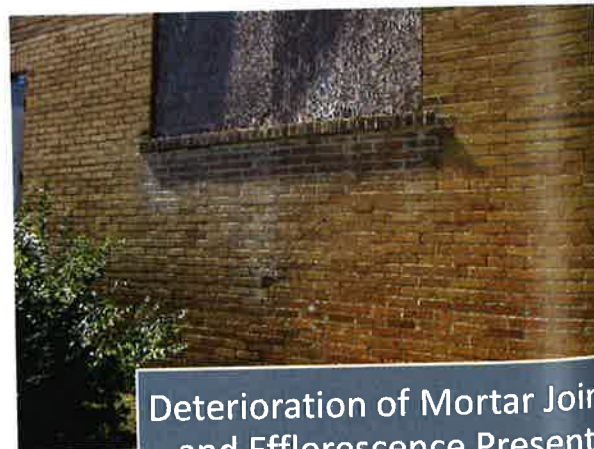
Moisture intrusion around skylights should be addressed by properly sealing the window roof joint or by covering the skylights.

EXT.5 Brick Repair, Tuck Pointing and Expansion Joint Repairs

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Cracking of Walls and Foundations



Deterioration of Mortar Joints and Efflorescence Present.

Ideas / Opportunities

Opportunities exist for a great deal of mortar joint and exterior brick repairs, and re-caulking expansion joints. A variety of building surfaces will be cleaned/patched and painted.

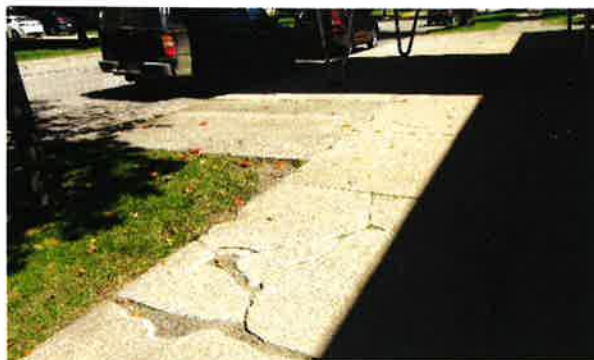
Grounds, Site, and Surroundings

Sidewalk Enhancements and Concrete Repair

☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Uneven and deteriorating concrete



Sidewalks have pitting and cracking should be repaired

Opportunities

Repair exterior concrete surfaces to improve safety and minimize moisture intrusion to prevent further damage.

Hazardous Materials

1. Asbestos Abatement

☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Provide an allowance to identify and abate any remaining asbestos that is found

Interior Spaces and Finishes

INT.1 Ceiling Replacement

- ☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Warped ceiling tiles



Stained ceiling tiles

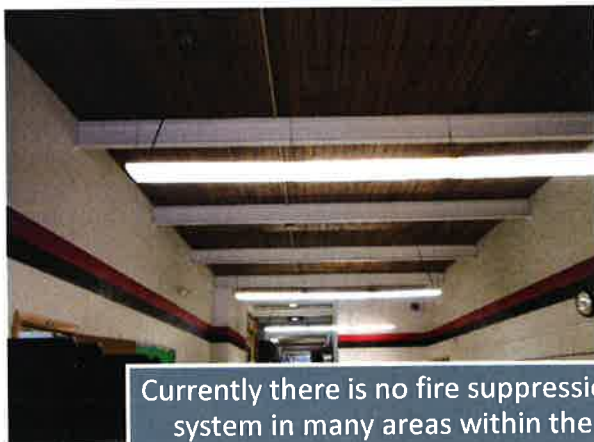
Ideas / Opportunities

Ceiling tiles throughout the district are warped or stained because of aging and water intrusion from the roof which has been addressed. These should be replaced.

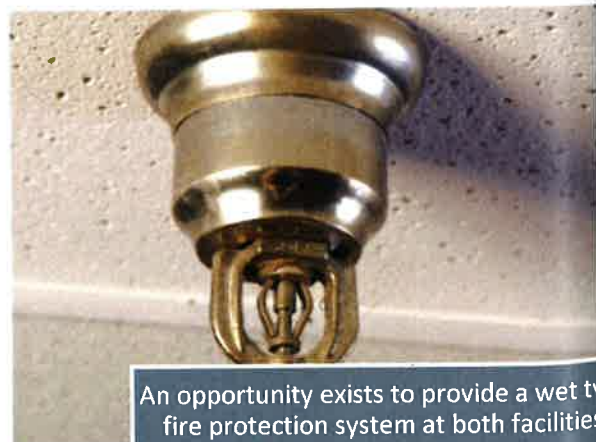
Life Safety Systems

LS.1 Fire Suppression Sprinkler System

- ☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Currently there is no fire suppression system in many areas within the school district.



An opportunity exists to provide a wet type fire protection system at both facilities. (stock photo)

M.1 Valve, Pipe and Accessory Fittings Insulation

- ☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Replace damaged Insulation on steam piping and fittings.



Insulate any bare steam and hot water piping and fittings.

Ideas / Opportunities

Install new fiberglass insulation with protective covering on uninsulated piping and new lace-up removable insulation covers over the valves, strainers and fittings throughout the building.

M.2 Boiler Replacement – Convert to Hot Water

- ☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Original steam boilers would be replaced with new high efficiency condensing hot water boilers to provide increased efficiency, state of the art control, and a more comfortable building environment.
(stock photo)

Consideration	Steam Heating Systems	Hot Water Heating Systems
Boiler Efficiency	78-84% combustion efficiency. - Greater cycling heat losses as boilers have limited modulation (turn-down) capabilities for part load.	86% to 92% combustion efficiency. - Less cycling heat losses as boilers have greater modulation (turn-down) for part load.
Space Constraints	Steam boilers typically require a greater footprint.	Condensing hot water boilers require less footprint.
Distribution System	- Greater losses due to higher fluid temperature (steam at 212 F). - No pumping system required for supply side, but condensate return will require some pumping. - Steam traps required (life expectancy of 5 to 7 years). - Failed traps contribute to system heat losses.	- Less losses as fluid temperature can be modulated to match load. - Pump system required for supply/return of hot water through building - No traps required.
Other Equipment Needed	- Deaerator - Boiler feed system - Blowdown tank	Expansion tank
Operating Expense	Steam systems have ongoing makeup water and chemical treatment costs. Maintenance staff must perform ongoing water chemistry tests and maintain chemical treatment systems. Boilers require more frequent blowdown and often require costly repairs after years of service.	Hot water systems are a closed system and do not require chemical treatment after system startup. Makeup water addition is minimal if at all.
Occupant Comfort	Due to poor controllability, steam systems more frequently overheat spaces, especially in milder weather.	Due to good controllability, hot water systems less frequently overheat spaces.
Controllability	Steam temperature cannot be modulated during part load or mild heating conditions.	Hot water temperature can be easily modulated during part load and mild heating conditions.
Need for Boiler's License	Boiler operator must be licensed.	Boiler operator does not require licensure.

M.3 Replace Steam Coils with Hot Water Coils

☐ High School/Middle School ☒ North Elementary ☒ South Elementary



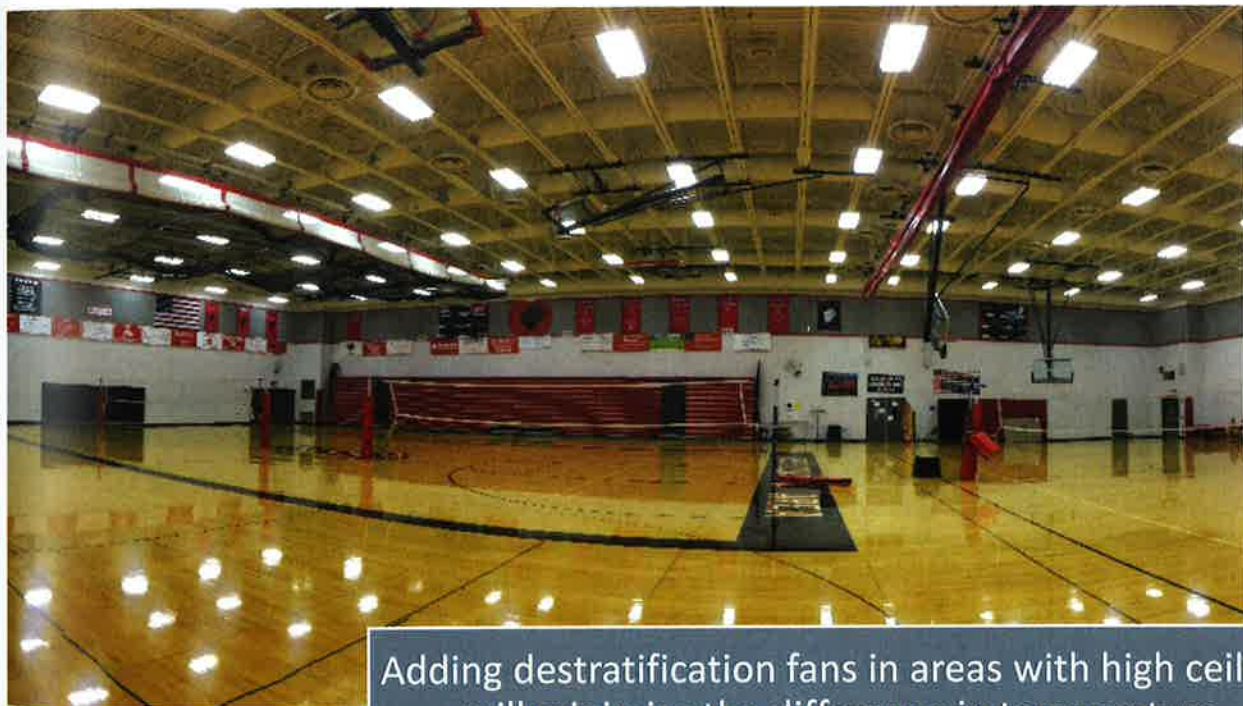
Old steam heating coils, steam traps, and piping will be removed...



...and replaced with new hot water pumps, piping, and heating coils (Stock Photo).

M.4 Destratification Fans

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Adding destratification fans in areas with high ceilings will minimize the difference in temperature.

Ideas / Opportunities

Install destratification ceiling fans and controls to eliminate temperature stratification; provide better mixing of the air in the space.

P.1 Plumbing Efficiency Improvements

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Flushometer valve tuning will get water consumption back to original design values.



Add automatic flushometer controls to fixtures with manual controls.



Replace/add sink faucet aerators to reduce water consumption.

Ideas / Opportunities

This facility improvement opportunity includes providing new components that feature state-of-the-art thermal plastic elastomers (TPE), a material proven 10 times more effective in resisting the effects of chemicals in water. It also includes replacing existing sink faucet aerators with new components that are pressure independent. All faucets would be modified (using various adapters) to use one size device; no longer requiring the need to stock various aerators to fit different faucets – one size fits all. Additionally, the new devices would utilize tamper-resistant technology so only the facility staff can remove the devices. The following are the proposed strategies to be implemented to improve the efficiency and performance of toilets, urinals, and sink faucets:

- **Flushometer Diaphragm Replacement:** Involves replacement of flushometer diaphragms on toilets and urinals. This involves use of a diaphragm designed to virtually eliminate “run-on” fixtures due to sediments in the water supply. The diaphragm has a three-year product warranty. The fixture spuds and flush tubes will be replaced as necessary.
- **Flushometer X-Body:** Install a flushometer X-Body valve with infrared sensor on each urinal to provide individual and automatic flush control.
- **Fixture tuning and Reengineering:** Involves implementing variable flow technology on flushometers on toilets and urinals. The amount of water and duration of flush cycles will be tuned according to the requirements of the fixture type and style.

P.2 New Lavatory Faucets, Sink Basins, Urinals and Toilets

- ☐ High School/Middle School ☒ North Elementary ☒ South Elementary



Replace aging plumbing fixtures...



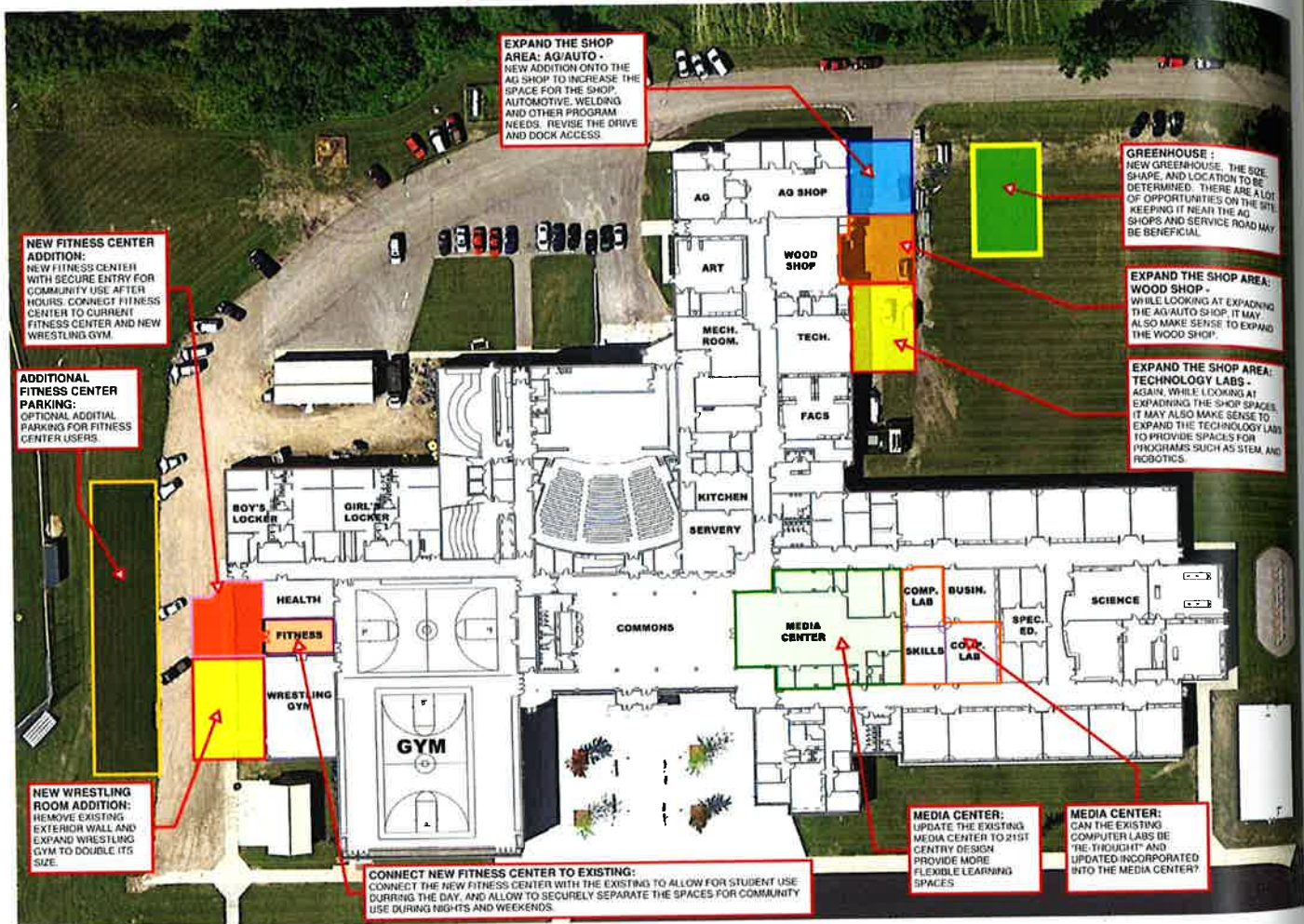
...with new fixtures within the facilities.

Programmatic Facility Systems

Prog.2

PROG.1 WCA Programmatic Interests

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



Ideas / Opportunities

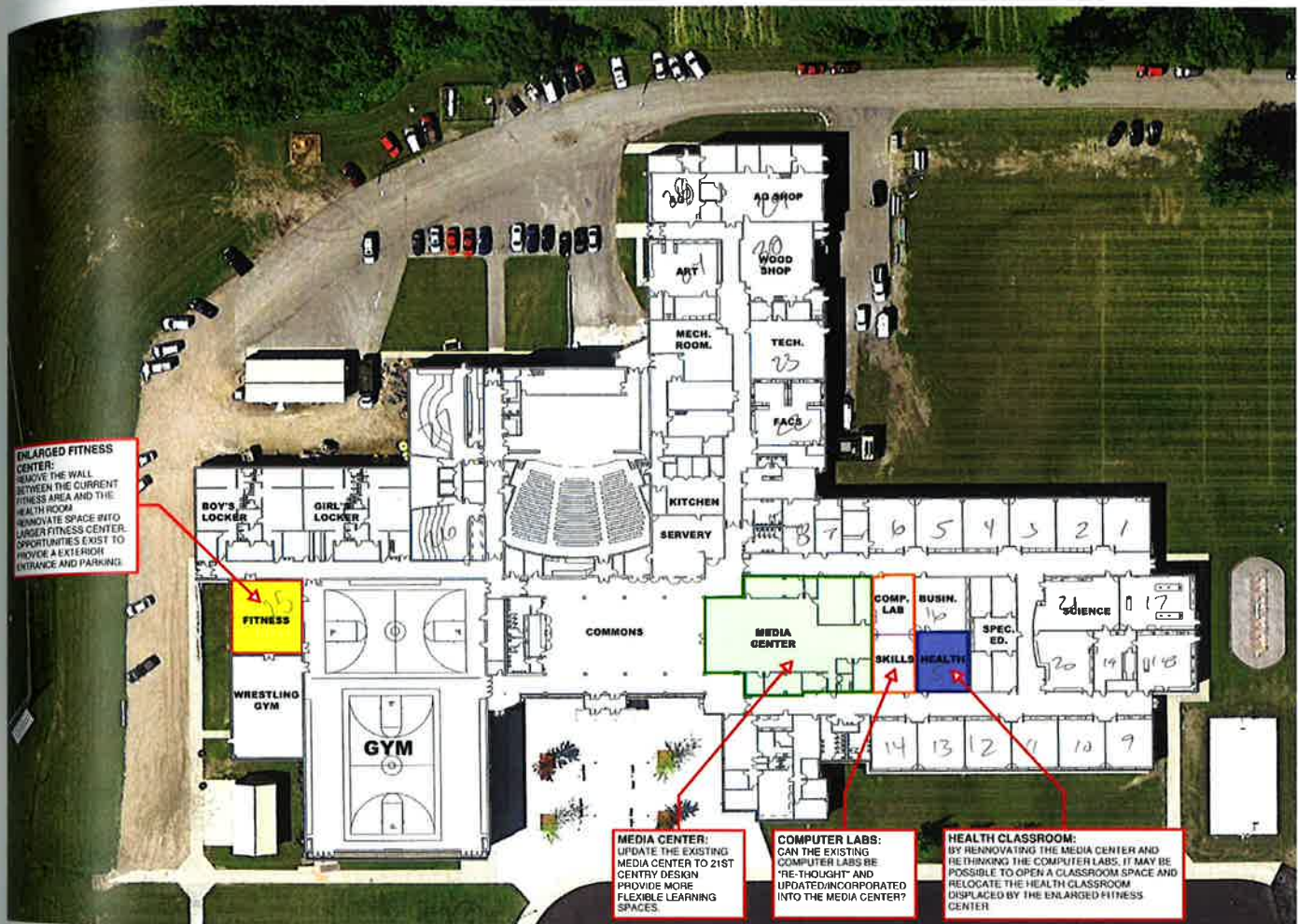
There were many improvements/issues identified by staff during the preliminary meeting with the district.

Some of the ideas discussed are listed below.

- It was mentioned that the exterior of the High School is starting to look dated. It is desired that replacing the green block and green metal panel with a new color, possibly a gray, be looked into.
- The existing tennis court pad would provide a suitable space to act as the new practice facility for the district's wrestling program or could allow for the expansion of the agricultural program within the district.

Prog.2 WCA Programmatic Interest Conceptual Option B

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



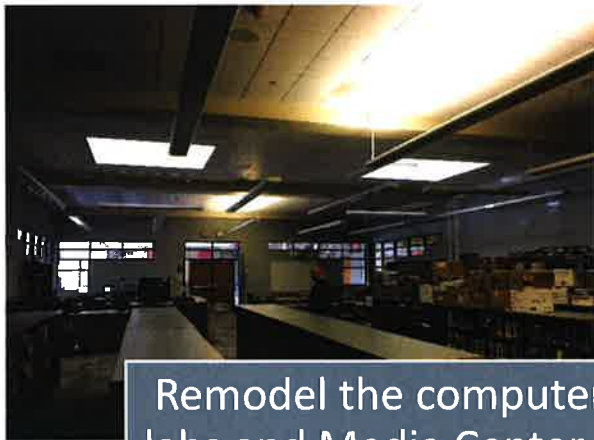
600
750

PROG.3 WCA Programmatic Interests

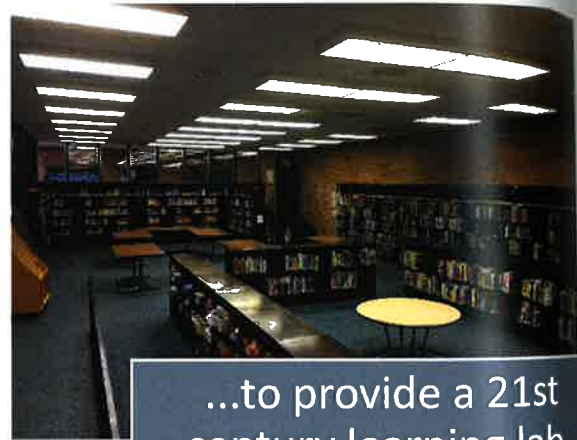


Tennis court
resurfacing needs

- Resurface the outdoor track.
- Remodel existing media center, creating a 21st century learning environment.



Remodel the computer
labs and Media Center...



...to provide a 21st
century learning lab.

- It was mentioned that there is a need to improve the high school's sensory rooms and special needs department.
- Construct a greenhouse for crop sciences.
- The wrestling gym is too small, a new or enlarged gym space is needed.
- The High School does not currently have a fitness center. A new school/community fitness center is desired. There are several options on how this may be added or incorporated.
- The existing automotive shop has become too small for the current enrollment. Investigate constructing an addition to the existing shop, repurpose existing space within the school, or constructing an auxiliary building.
- Future program expansions the district would like to see are more STEM programs, Robotics labs and more flexible learning spaces.
- North & South could both use a cosmetic "Face Lift" both inside and out.
- Both North & South have new secure entrances, but the entrances are not appealing. Providing a more inviting entry and adding canopies is desired.

- Both North & South have new secure entrances, but the entrances are not appealing. Providing a more inviting entry and adding canopies is desired.

Technology Systems

T.1 PA System and VOIP

- ☒ High School/Middle School
- ☒ North Elementary
- ☒ South Elementary



A new public announcement & bell system could be integrated into...



...both the elementaries and high schools

Ideas / Opportunities

The existing PA system in the elementary schools is poor and was mentioned to be a point of interest along with the bell system in the high school. Installing a bell within the elementary schools was also brought up and can be investigated.

Ventilation / Dehumidification Systems

V.1 Ventilation Upgrades

☒ High School/Middle School ☒ North Elementary ☒ South Elementary



The HVAC equipment utilizes hot steam and is far past the recommended age for replacement



Replace systems with new central air handling units and controls

Ideas / Opportunities

This facility improvement opportunity includes a variety of option to improve ventilation throughout the district. Ventilation upgrades would include new central systems as well as ductwork, terminal equipment and controls. The upgrades would provide adequate ventilation to the spaces served along with increased comfort control and efficiency. Possibilities include:

- Replace the air handling units at north and at south that have exceeded their useful life.
- The unit ventilators at north and south are nearly 50 years old and are not designed to provide adequate ventilation for classroom spaces. Units could be replaced with vertical style unit ventilators to meet ASHRAE ventilation requirements.
- The unit ventilators at north and south could also be replaced with central air handling systems. Central air handling systems provide adequate ventilation as well as an improved classroom environment with less background noise. Sound levels in rooms served by unit ventilators typically exceed the ANSI standard for classroom acoustics.
- Ventilation upgrades could also include dehumidification. Ventilation upgrades with dehumidification would further improve comfort, increase indoor air quality and prolong the life of furnishings and fixtures throughout the facility.

Renewable Energy and Sustainability

Integrating Sustainability into Designs

Over the past decade, an increasing number of school districts and institutions of higher education have taken steps to change the way they design and build school facilities. Districts have begun to incorporate a wide variety of environmental and health strategies into the construction and renovation process, with the goal of creating school buildings that focus on learners and value to the district while saving money, protecting the environment, and promoting the wellbeing of staff and students.

Our team takes a balanced and comprehensive view of designing high performance buildings - a whole building approach. This balanced approach does not champion a single facet at the expense of others, rather it seeks sound, common sense solutions to creating the best facilities possible within a given budget. Our approach incorporates design objectives that should be considered and optimized for a high-performance building:

- *sustainability*
- *accessibility*
- *aesthetics*
- *cost-effectiveness*
- *functionality*
- *historic preservation/value to the community*
- *productivity/health*
- *security/safety*

These aspects must be balanced. The district and the architecture and engineering team identifies the goals for each building. The team will determine how each design consideration is balanced against the others. The key to creating a high-performance building is an integrated approach that brings together all those who have a hand in designing, constructing, operating, and maintaining the building early in the process. In practice, a green school is the physical result of a consensus process of planning, design, and construction that takes into account a building's performance over its entire 50 to 60-year life cycle. The focus of the process is to reinforce optimal learning, a goal very much in keeping with the parallel goals of resource efficiency and minimal pollution. Such buildings provide clean fresh air, a comfortable temperature range, abundant light, and low distraction from unwanted noise while maximizing resource efficiency, minimizing pollution, and teaching students the importance of innovation in the created environment. The U.S. Green Building Council (USGBC), on its Greenschoolbuildings.org website, defines a green school as "A school building or facility that creates a healthy environment that is conducive to learning while saving energy, resources, and money." Specifically, as it relates to sustainability, the goal is to assure that the project's process and outcome complies with sustainability goals or certification strategies (e.g. USGBC – LEED) and aligns this with the initiatives valued by the district and its staff and students. Historically, specific "green" approaches have included:

- *specifying low-emitting materials*
- *improving indoor air quality*
- *reducing energy consumption*
- *reducing water usage*
- *building/facility re-use or adaptive re-use*
- *sourcing local products*
- *minimizing waste during construction*
- *evaluating thermal comfort*
- *day-lighting, etc.*
- *storm water management*
- *ongoing sustainability initiatives*

Potential at West Central Area for Renewable Energy Systems

There are various renewable energy sources that could be investigated as part of an energy project. Current paybacks for renewable projects are typically outside the necessary payback criteria but a smaller project could potentially be included in a comprehensive program.

WCA Schools

Bennett, MN

Energy Type:

Conventional

Source: US Energy Information Administration (EIA)

Electric	\$83.59 per MWh
Gas	\$13.66 per MMBtu
Oil	\$22.29 per MMBtu

Local Climate Data

Source: BinMaker Pro 3 Weather Data

Heating Degree Days:	9082 based on 65F
Cooling Degree Days:	665 based on 65F
Avg Outdoor Air Temp:	41.9 deg F

Financial Incentives

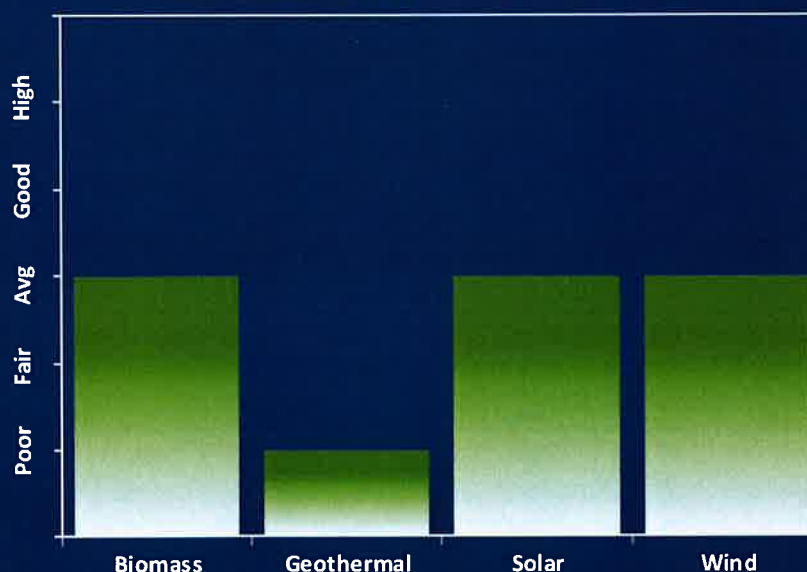
Source: US Department of Energy DSIRE

State Programs:	Yes
Utility Programs:	Yes
Local Programs:	No

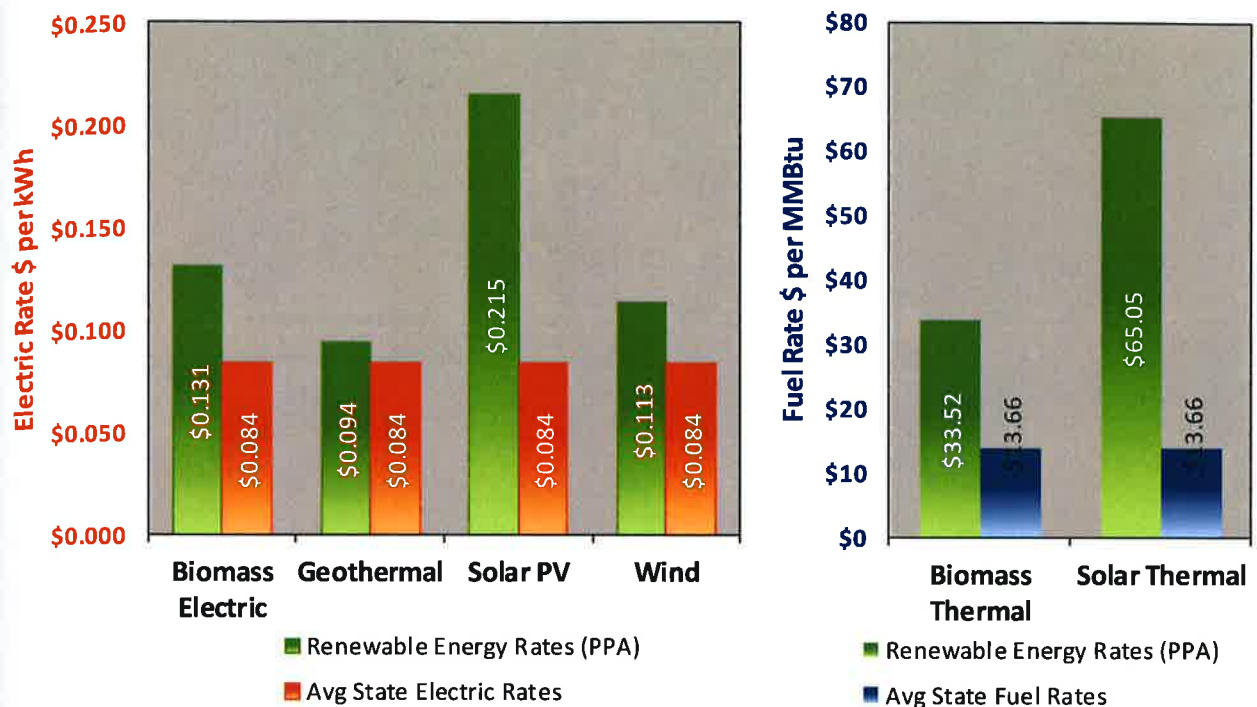
Renewable Energy Technologies

Biomass	200 1,000 Tonnes/Year
Geothermal	3.72 mW/ Sq Feet
Solar	0.44 Daily kWh / Sq Feet
Wind	18.9 Feet/Second

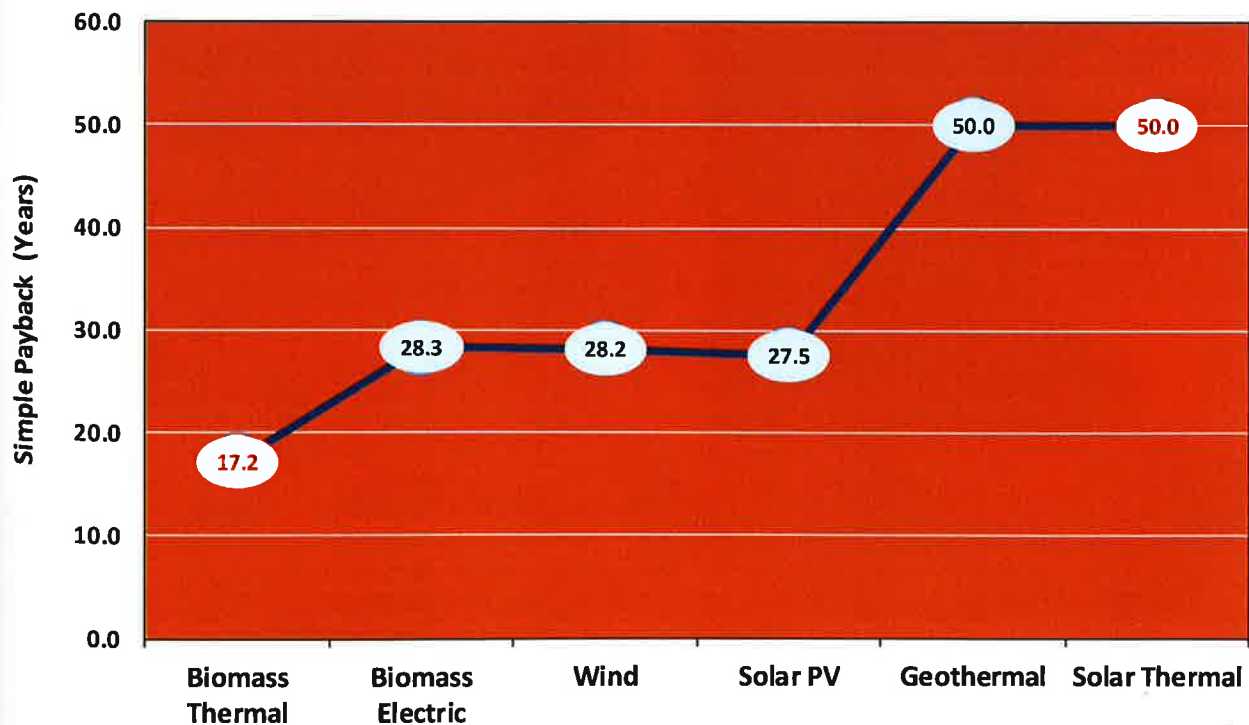
Renewable Resource Potential



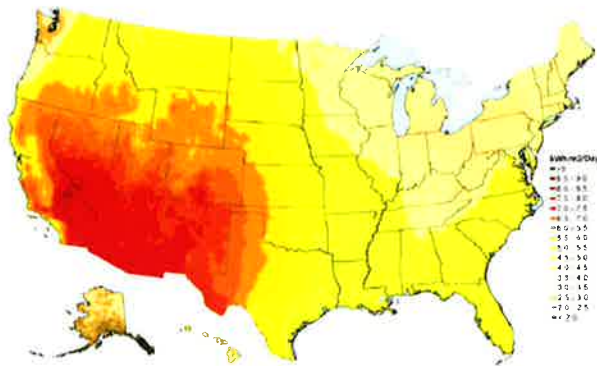
Renewable Energy Rates (PPA) versus Conventional Energy Rates



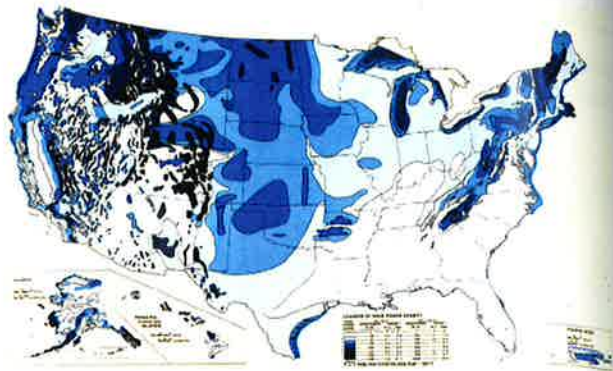
Renewable Technology Estimated Payback



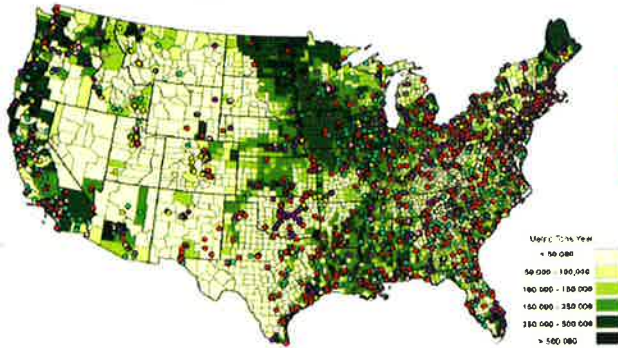
Radiant Solar Energy



Wind Resource

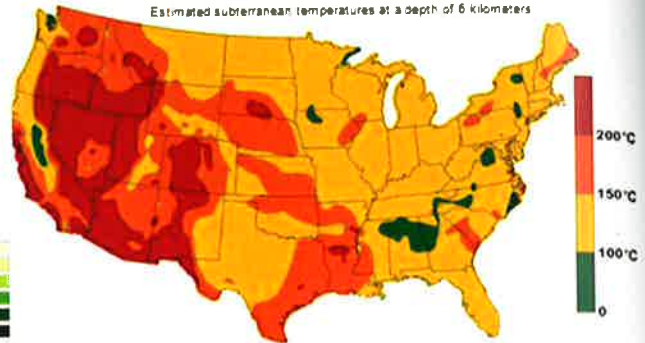


Biomass Resource

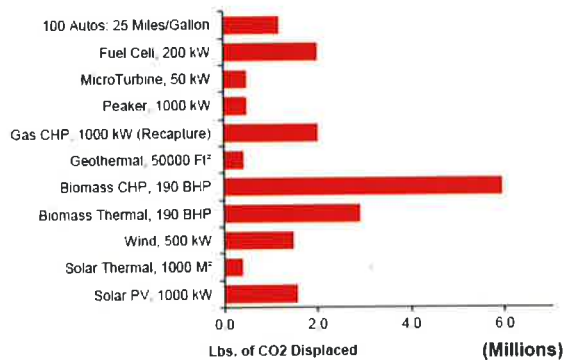


Geothermal Resource

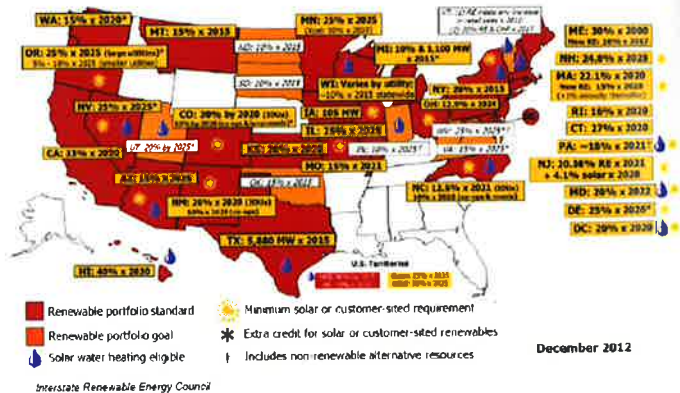
Estimated subterranean temperatures at a depth of 6 kilometers



Annual CO2 Reduction by Technology Model



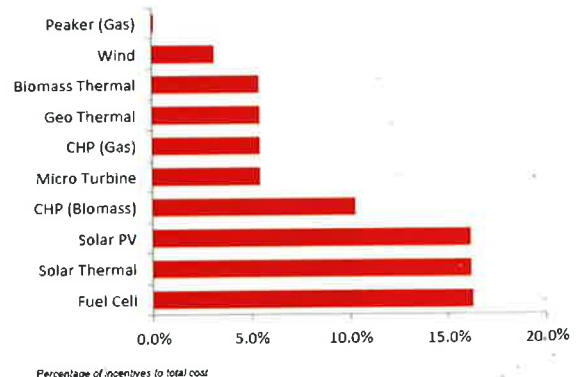
Renewable Portfolio Standards



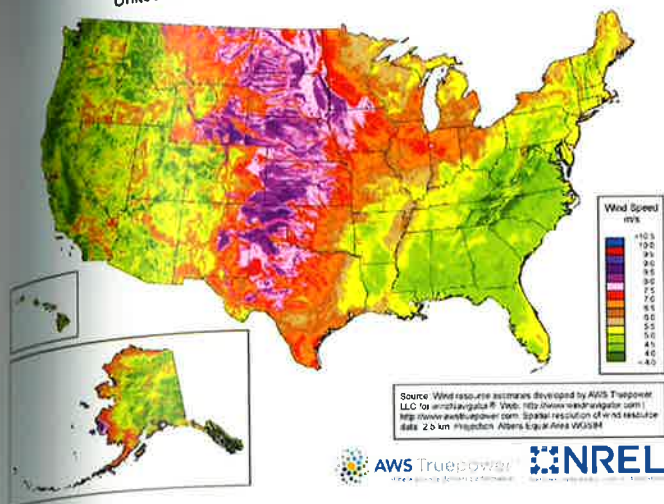
Renewable Incentives



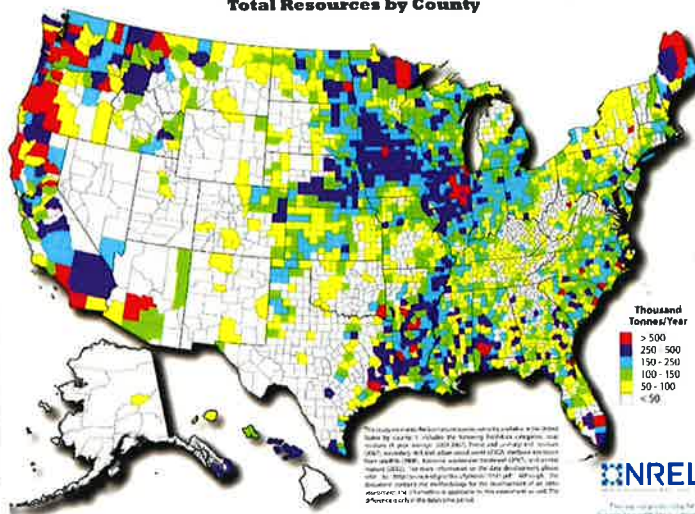
Incentives Available by Technology



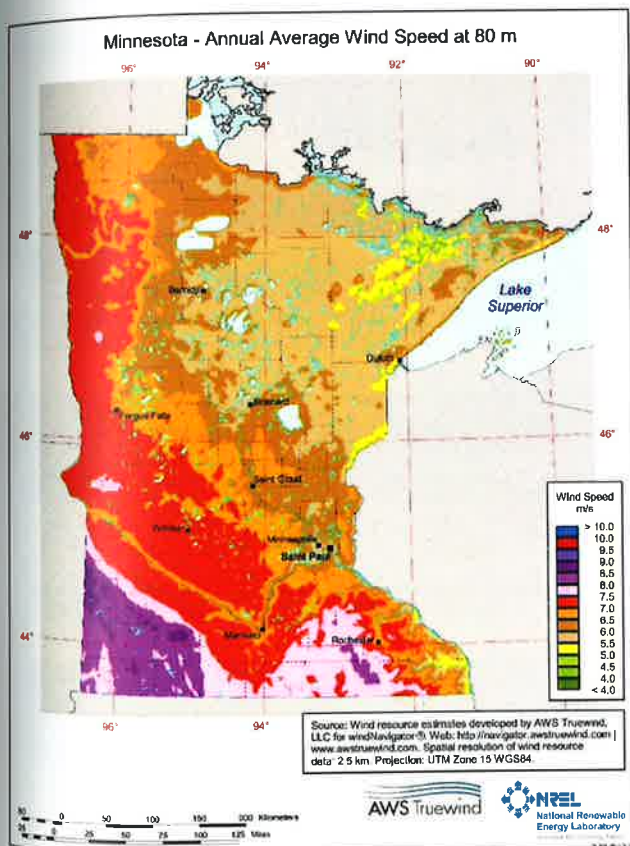
United States - Annual Average Wind Speed at 80 m



Biomass Resources of the United States
Total Resources by County

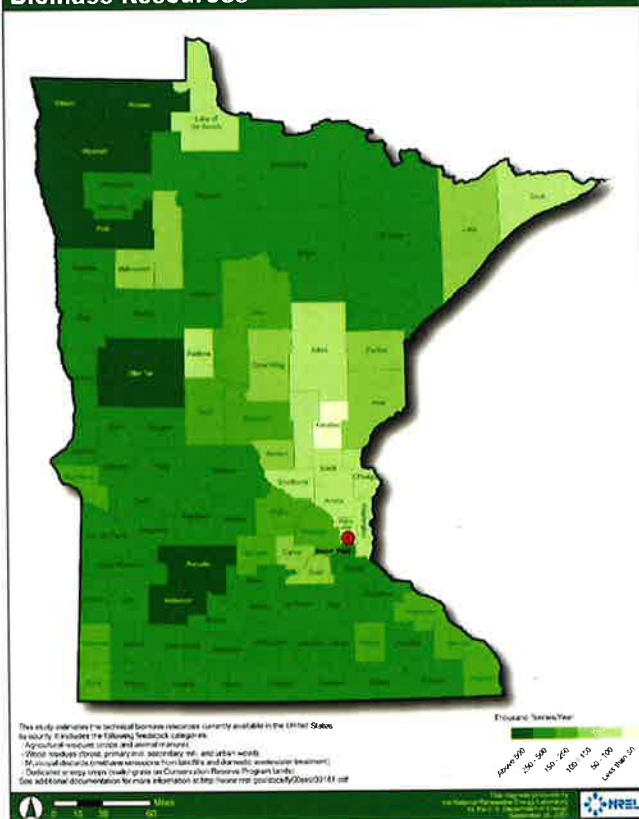


Minnesota - Annual Average Wind Speed at 80 m



Biomass Resources

Minnesota



Greenhouse Gas Emissions Report

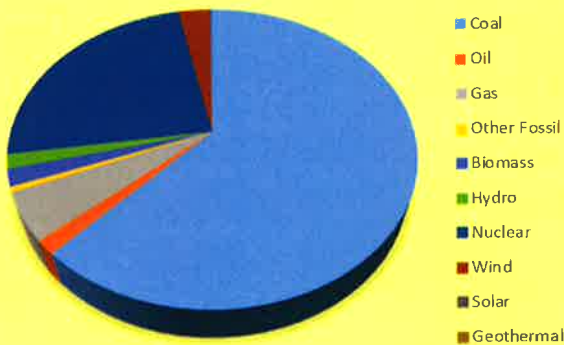
Greenhouse Gas (GHG) Emissions Report

WCA Schools
All Buildings

State MN

		Consumption			Cost	
		Existing	Guaranteed	Savings %	Existing	Guaranteed
Electricity	kWh	2,042,560	1,429,792	30.0%	\$170,732	\$119,512
Gas	MMBtu	1,377	1,033	25.0%	\$18,811	\$14,108
Fuel Oil	MMBtu	3,278	3,278	0.0%	\$25,249	\$25,249
Total Energy Cost	\$	\$214,792	\$158,870	26.0%	\$214,792	\$158,870
Nameplate Capacity		13,223	MW	Net Generation	52,906,085	MWh

Generation Methods for the State of MN



Generation Methods for the U.S. Overall



Generation Resource Mix (Percent)

	Coal	Oil	Gas	Other Fossil	Biomass	Hydro	Nuclear	Wind	Solar	Geothermal	Purchased
MN	62.1%	1.5%	5.1%	0.6%	1.9%	1.5%	24.3%	3.0%	0.0%	0.0%	0.1%
US	49.6%	3.0%	18.8%	0.6%	1.3%	6.5%	19.3%	0.4%	0.0%	0.4%	0.1%

Greenhouse Emission Calculation for Electricity

Electricity	Name (Symbol)	Global Warming Potential	Emission Factor	Units	Existing Emissions			Post-Retrofit Emissions		
					lbs	Tonnes	CO ₂ Equivalent (Tonnes)	lbs	Tonnes	CO ₂ Equivalent (Tonnes)
	Carbon Dioxide (CO ₂)	1	1,594.67	lb/MWh	3,257,209	1,477.4	1,477.45	2,280,046	1,034.2	1,034.21
	Methane (CH ₄)	21	38.72	lb/GWh	79.09	0.036	0.75	55.36	0.025	0.53
	Nitrous Oxide (N ₂ O)	310	28.49	lb/GWh	58.19	0.026	8.18	40.73	0.018	5.73
Sub Total					3,257,346	1,477.5	1,486.38	2,280,142	1,034.3	1,040.47

Greenhouse Emission Calculation for Gas

Gas	Name (Symbol)	Global Warming Potential	Emission Factor	Units	Existing Emissions			Post-Retrofit Emissions		
					lbs	Tonnes	CO ₂ Equivalent (Tonnes)	lbs	Tonnes	CO ₂ Equivalent (Tonnes)
	Carbon Dioxide (CO ₂)	1	116.39	lb/MMBtu	160,281	72.7	72.70	120,211	54.5	54.53
	Methane (CH ₄)	21	0.00	lb/MMBtu	0.00	0.000	0.00	0.00	0.000	0.00
	Nitrous Oxide (N ₂ O)	310	0.00	lb/MMBtu	0.00	0.000	0.00	0.00	0.000	0.00
Sub Total					160,281	72.7	72.70	120,211	54.5	54.53
Total Greenhouse Gas Emissions					3,940,976	1,787.6	1,796.5	2,923,701.8	1,326.2	1,332.4

Carbon Equivalents of Utilities

	Existing	Guaranteed	Savings
Passenger Cars on the Road	343.5	254.8	88.7
Gallons of Gas Consumed	202,078	149,874	52,204
Barrels of Oil Consumed	4,178	3,099	1,079
Home Electrical Consumption	233.3	173.0	60.3
Propane Cylinders	33,268	24,674	8,594
Railcars of Coal Burned	9.4	7.0	2.4
Acres of pine trees	1,497.1	1,110.3	386.7

eed
19,512
14,108
25,249
158,870

6,085 MWh
Overall

- Coal
- Oil
- Gas
- Other Fossil
- Biomass
- Hydro
- Nuclear
- Wind
- Solar
- Geothermal

Thermal	Purchased
%	0.1%
%	0.1%

Emissions	
CO ₂ Equivalent (Tonnes)	
4.2	1,034.21
2.5	0.53
1.8	5.73
4.3	1,040.47

Emissions	
CO ₂ Equivalent (Tonnes)	
5	54.53
0	0.00
0	0.00
5	54.53
5.2	1,332.4

ings
7
04
9
3
4
7

Potential Funding Mechanisms



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

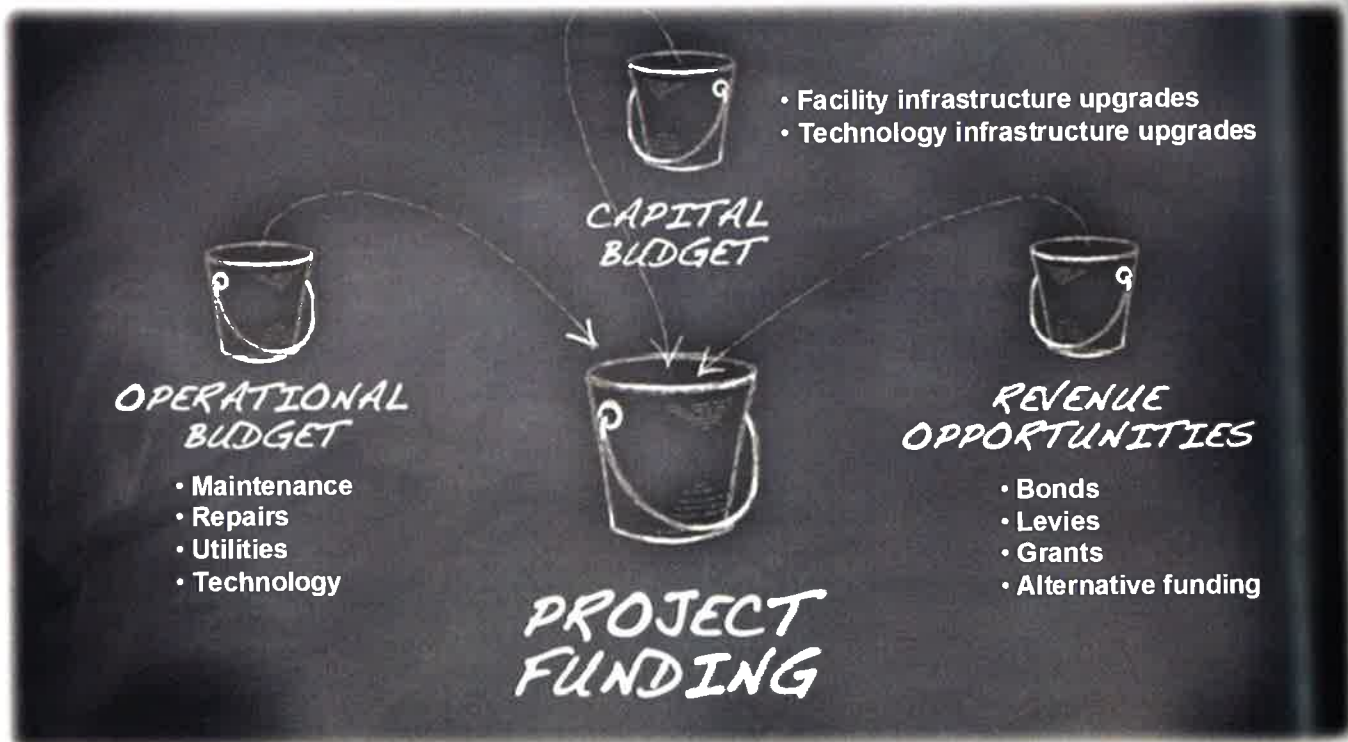
This section outlines financial projections based on the results of the preliminary energy and operational analysis performed at West Central Area Schools' facilities. The purpose of this report is to present the opportunities identified during our preliminary analysis and to conservatively project the **potential financial impact** to the district.

This preliminary financial analysis includes energy conservation measures that will generate significant energy savings, which will pay for themselves over a relatively quick period. In addition, this analysis includes facility improvements identified by Unesco such as ventilation improvements, deferred maintenance, capital improvements, and operational design deficiency opportunities, which will have longer paybacks, but may be justified because of the resulting improvements to comfort, operations, equipment reliability, and/or extended equipment longevity.

In addition, we have included multiple preliminary **cash flow analyses**. These are not intended to specify a particular project scope, but are included to demonstrate a potential project size and the representative cash flow analysis based solely on the preliminarily projected energy savings identified in this report.

Potential Funding Sources

Unesco will explore multiple funding sources that may be used for financing the district's Master Facility Plan. Unesco's approach is to capitalize on the least expensive forms of project funding first (e.g. utility company rebates), before utilizing more expensive forms of financing such as third party financing. The following sources will be analyzed and included in the detailed audit analyses:



Third Party Financing

Third party financing is available for funding Master Facility Plans through a number of different financial instruments including Municipal, Operating and Capital Leasing, Certificates of Participation, Capital Facilities Bonds and numerous others. Many variations of third party financing exist with terms typically available for up to 15 years. Recent projects financed through these instruments have been in the range of 2.75% to 3.25% depending on loan terms.

Utility Company Rebate Programs

Many utility service providers offer their customers rebates for various energy conservation improvements. These include rebates for lighting, energy efficient motors and variable speed drives to name a few. As part of the funding/financing for your Master Facility Plan, Unesco will calculate the rebates on a per-retrofit and per-building basis.

Government Programs

Qualified Zone Academy Bonds (QZABs)

Qualified Zone Academy Bonds (QZABs) are bonds with government subsidies to cover interest expense. The net is a 0.1% to 2.0% net cost of financing.

To qualify for a QZAB, 35% of a school district's students must be eligible for free or reduced cost lunches under the National School Lunch Act. West Central Area Schools should qualify for this financing vehicle. In addition, the school must receive written commitments from private entities to make "qualified contributions" to the school having the present value of at least 10% of the proceeds of the QZAB.



Improvements and upgrades for old boiler plants, lighting quality, mechanical HVAC upgrades, utility services, water saving equipment and HVAC control. Taxpayers benefit from the energy-saving project, as they will not have to endure any tax increases.

Lease Levy

A building lease levy is a potential funding source for the construction of additional classrooms or a multipurpose space. Characteristics of a lease levy (statute attached):

- West Central Area Schools can levy (annually) \$212 times the adjusted pupil units (APUs) for the fiscal year to which the levy is attributable.
- Leased space cannot exceed 20% of existing building.
- The space in question has to be used for "instructional purposes." A multipurpose room or classrooms would qualify. In contrast, a new kitchen would not.
- The new addition would be secured with a "Ground Lease." A local bank would hold the land and building as security. As a stipulation, the building would need access from outdoors. As an aside, the district would pay a higher interest rate on this financing vehicle, as the lease levy must be appropriated each year, and the district is not under a general obligation to make payment; in essence, this is a riskier proposition for the banks.

Tax Abatement Levy

Tax abatement bonds (MS 469.1812 to 469.1815) can be used for parking lot projects.

- Bonds can be issued up to 15 years, are not subject to levy limitations, and are excluded from the calculation of the net debt limit.
- Abatement bonds are also exempt from the referendum requirement, as long as the project is determined to be eligible for this type of financing.
- Determine project eligibility. This involves Unesco, bond counsel, and the Minnesota Department of Education.
- Hold a public hearing on the project and adoption of a resolution specifying the terms of the abatement.

Long-Term Facilities Maintenance Revenue

Deferred Maintenance is defined as maintenance items that are needed, but have not yet been budgeted. Due to inevitable budget constraints, most school districts have no choice but to defer needed improvements. However, when left uncorrected, deferred maintenance items will often cause additional secondary damage and thus increase the total cost of correction. This viscous circle has plagued our schools for decades and is one of the main culprits responsible for the condition of schools.

In 2015, the Minnesota Legislature acted by providing school districts with increased levy authority to address deferred maintenance needs (M.S. 123B.595). In addition to increased levy authority, another advantage of this form of funding is that the State of Minnesota will equalize a significant portion in the form of aid. Highlights of this statute are as follows:

Subdivision 1

- For Fiscal Year **2017** only, long-term facilities maintenance revenue equals the greater of (1) **\$193** times the adjusted pupil units, times the lesser of one or the ratio of the district's average building age to 35 years, plus the cost approved by the commissioner for indoor air quality, fire alarm and suppression, and asbestos abatement projects under section 123B.57, subd. 6, with an estimated cost of \$100,000 or more per site or (2) the sum of the amount the district would have qualified for under MN Statute 2014, section 123B.57, MN Statutes 2014, section 123B.59, and MN Statutes 2014, section 123B.591;
- For Fiscal Year **2018** only, long-term facilities maintenance revenue equals the greater of (1) **\$292** times the adjusted pupil units, times the lesser of one or the ratio...
- For Fiscal Year **2019** and later, long-term facilities maintenance revenue equals the greater of (1) **\$380** times the adjusted pupil units, times the lesser of one or the ratio...

Subdivision 4

Requires **10-year plan** to access money regardless if issuing bond to finance plan or levying for the annual costs.

Subdivision 5

Spells out bonding mechanism, levy and maximum aid calculations, etc. ...

November 20, 2017

Subdivision 10

Allowed uses for long-term facilities maintenance revenue. A district use revenue under this section for any of the following:

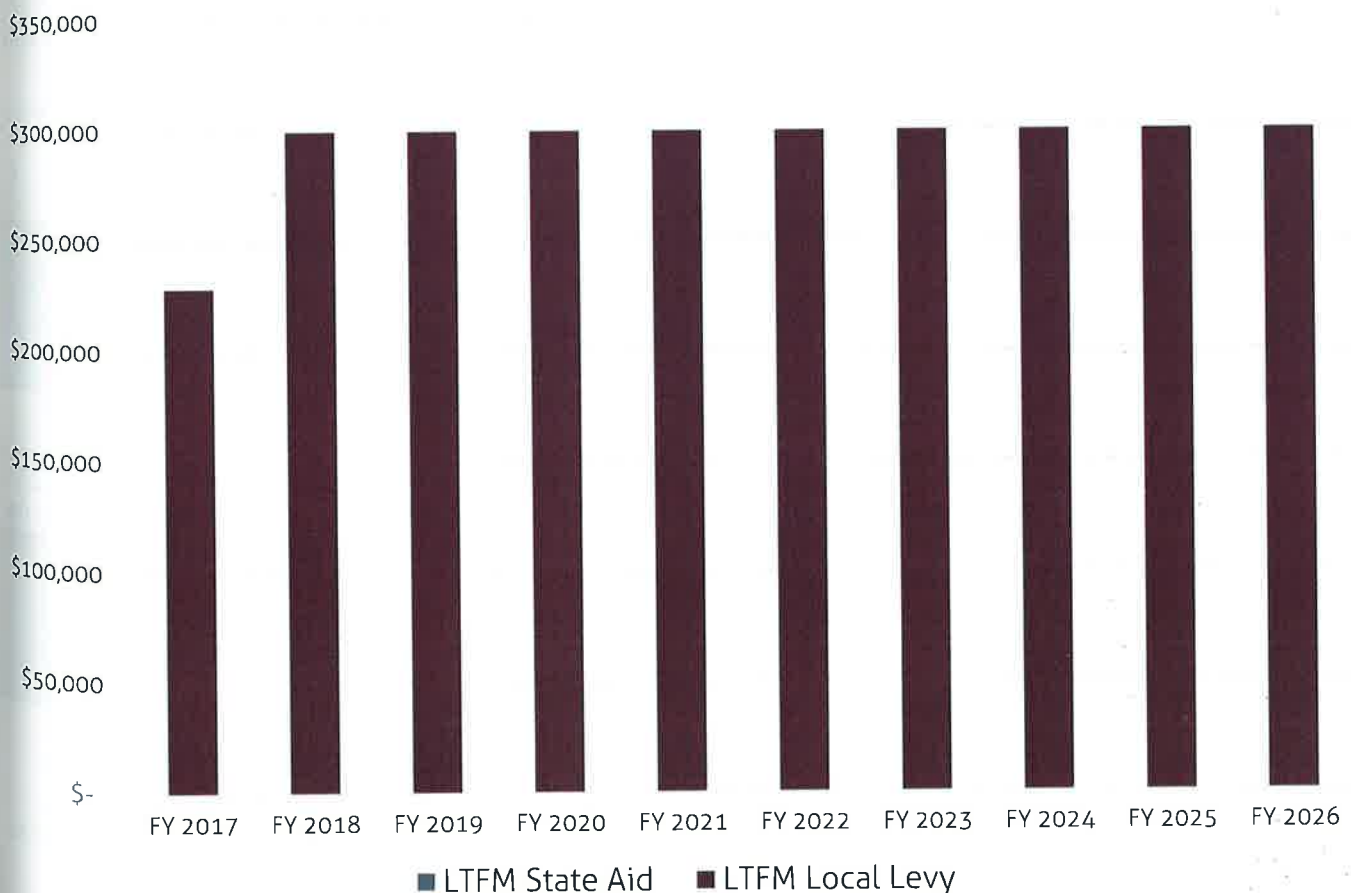
- Deferred capital expenditures and maintenance projects necessary to prevent further erosion of facilities; or
- Increasing accessibility of school facilities; or
- Health and safety capital projects under section 123B.57.

Subdivision 11

Restrictions on long-term facilities maintenance revenue. Notwithstanding subdivision 11, long-term facilities maintenance revenue may not be used:

- For the construction of new facilities, remodeling of existing facilities, or the purchase of portable classroom; or
- To finance a lease purchase agreement, installment purchase agreement or other deferred payments agreement; or
- For energy-efficiency projects under section 123B.65, for a building or property or part of a building or property used for postsecondary instruction or administration; or
- For a purpose, unrelated to elementary and secondary education; or
- For violence prevention and facility security, ergonomics, or emergency communication devices.

Maximum LTFM Revenue for West Central Area Schools



Long-Term Facilities Maintenance Bonding

Bonding enables a district to bond for projects over a number of years related to deferred maintenance issues in the facilities. Long-Term Facilities Maintenance Bonding affords public school districts the option of bonding up to 30 years, thereby minimizing the immediate impact on the local taxpayers. There are several advantages of this approach:

- **One-time approval.** The Minnesota Department of Education (MDE) would review and approve the project(s) in year one; the project(s) would not be subject to review in subsequent years.
- **Level taxes.** The district could establish a long-term levy amount, keeping taxes level to taxpayers.
- **Low Finance Levels.** Currently, the cost of capital is (historically) low. Couple this with low construction costs...now is a great time to modernize facilities.

Voter-Approved School Building Bonds

The district may submit a bond issue for voter approval during a special or regular election¹¹. With the exceptions below, an election for the sale of bonds to finance a building project may be held at any time that is allowed under the state's regular election laws.

A special election may not be held:

- During the 56 days before and the 56 days after a regularly scheduled primary¹² or general¹³ election conducted wholly or partially within the school district;
- On the date of a regularly scheduled town election or annual meeting in March conducted wholly or partially within the school district; or
- During the 30 days before or the 30 days after a regularly scheduled town election¹⁴ in March conducted wholly or partially within the school district.

Frequently Asked Questions

How many elections may be held in any one calendar year?

An election to approve the sale of bonds may be held more than once in a year. However, the same question authorizing the same amount of bonds must not be submitted to the voters until 180 days have passed since the date the election failed. If the election fails a second time, the same question for the same project and the same amount of bonds may not be submitted within one year of the second election. There are no statutory limits on how many times during a calendar year a school district may conduct a referendum for a down payment levy.

When does the district need to notify?

At least 74 days before every school district election, the school district clerk shall provide a written notice to the county auditor of each county in which the school district is located, the Minnesota Commissioner of Education, and the Minnesota Secretary of State.

¹¹ 2014 Legislative change no longer allows special election to be held in conjunction with township election.

¹² Primary election is second Tuesday in August (regular in even year; special in odd years) - no election 56 days either side of this date.

¹³ General election is first Tuesday after first Monday in November - no election 56 days prior and 56 days after this date.

¹⁴ Normally, 2nd Tuesday in March is reserved for Town General Elections - no special election on this date or 30 days either side of this date. Also, no election within 56 days either side of any election of a municipality that lies within the district.

2017 Special Election Blackout Dates

JANUARY

S	M	T	W	T	F	S
	2	3	4	5	6	7
1	9	10	11	12	13	14
8	16	17	18	19	20	21
15	23	24	25	26	27	28
22	30	31				

FEBRUARY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

MARCH

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

APRIL

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

MAY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JUNE

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

 Township Election
 Regular Election

 Primary Election
 Blackout – Special Elections not permitted

JULY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

AUGUST

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

DECEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

 Township Election
 Regular Election

 Primary Election
 Blackout – Special Elections not permitted

Internal Funds

Internal funds, depending on fund balances and other financial consideration, may be used to fund Master Facility Plans. These funds may come from operating and/or capital budgets as well as other sources such as available bond funds that may be the result of a successful Referendum. For some projects and assuming sufficient fund balances, using internal funds is the simplest and in some respects the least costly option.

Minnesota K-12 Funding Options Summary

Description	MN Statute	Use of Funds	Does this generate new dollars to district budget	Does this require Voter Approval	What kind of borrowing?	Will there be a new tax impact associated with levy		Who pays for the levy and which tax base is utilized	Max Term
						Several options	No		
Energy Efficiency Project	123B.65	Multiple Uses	No	No	Several options	No	No	Not Applicable	15 years
Referendum Revenue / Operating Levy Revenue	126C.17	Day-to-day operations	Yes	Yes	Typically, none	Yes	Yes	House, garage, and one acre; RMV	10 Years
School Building Bonds	475 & 123B.02	Capital Expenditures	Yes	Yes	General Obligation	Yes	Yes	All taxable property; NTC	30 years or useful life
Capital Projects Levy	123B.63	Capital expenditures defined in 126C.10 subd. 14	Yes	Yes	Certificates of Participation	Yes	Yes	All taxable property; NTC	10 Years
Capital Facilities Bonds	123B.62	Capital expenditures defined in 126C.62	No	No	General Obligation	No	No	Not Applicable	15 years or useful life
Capital Equipment Notes	123B.61	Capital expenditures defined in 126C.61	No	No	General Obligation	No	No	Not Applicable	10 years or useful life
Long-Term Facility Maintenance Levy	123B.595	Deferred capital expenditures & Health and Safety projects	Yes	No	General Obligation	Yes	Yes	All taxable property; NTC	30 years or useful life
Lease Levy / Capital Levies	126C.40	Capital expenditures defined in 126C.40	Yes	No	Certificates of Participation	Yes	Yes	All taxable property; NTC	30 years or useful life
Abatement Bond	469.1812 to 469.1815	School Parking Lot Improvements	Yes	No	General Obligation	Yes	Yes	All taxable property; NTC	15 years or useful life

Project Selection Matrix

As Unesco performs a comprehensive analysis of all aspects of a district's physical plant, we will identify hundreds (if not thousands) of solutions to the district's Physical, Educational, and Functional needs. We term these solutions to be "Facility Improvement Measures" (FIMs). We catalog these FIMs on a "Project Selection Matrix," which can be as simple as an Excel file or as sophisticated as a cloud-based, client accessible database. We start with "rough order magnitude" cost and savings estimations and progress to detailed, investment-grade calculations and construction budgets as we move through the planning process. Districts use this assessment information to develop prioritized, long-range facility plans. On the following pages, we provide an abbreviated sample of a Project Selection Matrix.

Key for District Prioritization

Priority	When
1. Immediate	2014
2. High	2015
3. Medium	3 to 5 years
4. Low	6 to 10 years
5. Long Term	10+ years

XYZ Schools

Rough Order of Magnitude (ROM) Project Selection Matrix

Facility	Scenario		FIM Code	Facility Improvement Measures (FIMs)		Asset Condition	District Priority	Funding Sources	Annual Savings		Rebate / Grant	Net Cost	Simple Payback
	#1	#2	#3	#4					Utility	O&M			
XYZ High School					A Accessibility								
		X			A.1 Provide Automatic Door Openers								
			X		A.2 Remodel Toilet Facilities	Caution		LTFM					
				X	A.3 Remodel Staff Toilet Facilities	Alert		LTFM					
		X			A.4 Modify Door Hardware	Caution		LTFM					
					A.5 Provide Room Signage			LTFM					
			X		A.6 Modify Handrails	Danger		LTFM					
		X	X		A.7 Elevators and Lifts	Alarm		LTFM					
					C Energy Management and Controls								
		X			C.1a Energy Management and DDC - Base Project	Caution		LTFM					
			X		C.1b Energy Management and DDC - Enhanced Scope	Caution		LTFM					
			X		C.2 Pneumatic/Electric Control System Improvements	Alert		LTFM					
	X	X	X		C.3 Refrigeration Compressor Controls	Caution		EO					
					E Electrical Systems								
					E.1a LED Lighting Retrofit	Acceptable		EO					
					E.1b LED Lighting Retrofit with Some Fixture Replacement	Acceptable		LTFM					
Oftentimes a district identifies high-priority FIM(s) for immediate implementation. Through a workshop process, the district will develop project "scenarios" for funding and cash flow modeling. An "X" in the column indicates the FIM is included in the respective project scenario.													
					E.2 Lighting Controls			EO					
					E.3 Motor Efficiency Improvements	Alert		EO					
					E.4 Variable Speed Drives/Ventilation Control	Caution		EO					
					E.5 Variable Speed Drives/Pumps	Caution		EO					
					E.6 Upgrade Main Electrical Service and Switchgear	Alert		H&S					
					E.7 Fusebox and Feeders	Alarm		H&S					
					E.8 Trace Entire Electrical Distribution System			LTFM					
					E.9 Additional Outlets in Science Room								

Key for Asset Condition

Acceptable	Equipment is in acceptable condition and meets or exceeds the
Caution	Equipment is in acceptable condition and meets or exceeds the
Alert	Equipment is in need of repair or maintenance prior to the
Danger	Equipment is in need of repair or maintenance prior to the
	Equipment is in need of repair or maintenance prior to the
	Equipment is in need of repair or maintenance prior to the
	Equipment is in need of repair or maintenance prior to the

Key for District Prioritization

Priority	When
1. Immediate	2014
2. High	2015
3. Medium	3 to 5 years
4. Low	6 to 10 years
5. Long Term	10+ years

Key for Asset Condition

Acceptable	Equipment is in acceptable condition and meets or exceeds the
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Alert	Equipment is in need of repair or maintenance prior to the
Danger	Equipment is in need of repair or maintenance prior to the
	Equipment is in need of repair or maintenance prior to the
	Equipment is in need of repair or maintenance prior to the
	Equipment is in need of repair or maintenance prior to the

Key for District Prioritization	Priority	When
1	Immediate	2017
2	High	2018
3	Medium	2019
4	Low	2020-2021
5	Long Term	2022+ Years

XYZ Schools

Rough Order of Magnitude (ROM) Project Selection Matrix

Key for Asset Condition	Condition
1	Excellent
2	Good
3	Fair
4	Poor
5	Very Poor

Facility	Scenario #1 #2 #3 #4	FIM Code	Facility Improvement Measures (FIMs)	Asset Condition	District Priority	Funding Sources	Annual Savings		Rebate / Grant	Net Cost	Simple Payback
							Utility	O&M			
XYZ High School (cont.)		EQUIP	Capital Equipment/Assets								
		EQUIP.1	Kitchen ; Freezers and Coolers	Alert							
		EQUIP.2	Kitchen Appliances; Stove	Alert							
		EQUIP.3	Kitchen; Booster Heater	Alert							
		EQUIP.4	Maintenance -- Scrubbers, Vacuums								
		EQUIP.5	Theatre, Stage Equipment	Caution		LTFM					
		EQUIP.6	Theatre, Curtains	Danger		LTFM					
		EQUIP.7	Weight Room Equipment								
		EQUIP.8	Gymnasium Equipment / Dividers			LTFM					
		EQUIP.9	FF&E; Desks and Chairs								
		EQUIP.10	FF&E; Auditorium Seating								
XYZ High School (cont.)		EQUIP.11	FF&E; Bleachers								
		EXT	Exterior Envelope Including Roofing								
		EXT.1	Seal Building Envelope to Minimize Air Leakage	Caution		LTFM					
		EXT.2	B-Wing Roof Replacement - Single-ply adhered	Alert		LTFM					
		EXT.3	B-Wing Roof Replacement - Built-Up	Alert		LTFM					
		EXT.4	Replace Wood Windows on North Exposure	Caution		LTFM					
		EXT.5	Replace Wood Windows on West Exposure	Alert		LTFM					
		EXT.6	New Aluminum Entrance on North Door	Caution		LTFM					
		EXT.7	New Exterior Doors on Gymnasium	Caution		LTFM					
		EXT.8	Tuckpoint West Exposure of Building	Alert		LTFM					
		EXT.9	Paint Facia on Entire Building	Alert		LTFM					
XYZ High School (cont.)		G	Grounds, Site, and Surroundings								
		G.1	Re-route Bus Drop Off	Danger		LTFM					
		G.2	Reseal Parking Lot	Alert		TA					
		G.3	Concrete Sidewalk Replacement	Caution		LTFM					
		G.4	Bituminous Surface Replacement	Caution		LTFM					
		G.5	Concrete Wall Repair	Alert		LTFM					
		G.6	Baseball Field Dugout Repair	Caution		LTFM					
		G.7	Tennis Court Painting	Alert		LTFM					
		HAZ	Hazardous Materials								
		HAZ.1	Abate Asbestos Vinyl Floor Tile			LTFM					
		HAZ.2	Abate Asbestos Carpet and Wood Floor			LTFM					
XYZ High School (cont.)		HAZ.3	Abate Asbestos Baseboard/Mopboard			LTFM					
		HAZ.4	Abate Ceiling Tile			LTFM					
		HAZ.5	Abate Asbestos Steam Pipe Insulation			LTFM					
		HAZ.6	Abate Asbestos Pipe Joints			LTFM					

Unesco evaluates 16 categories of physical, facility needs. We group FIMs into categories.

This column provides an abbreviated description of the various FIMs (solutions to physical, educational, and functional needs).

Key for District Prioritization

Priority	When
1	Immediate
2	High
3	Medium
4	Low
5	Long Term

Key for Asset Condition

Asbestos	Equipment in satisfactory condition and minor useful life
Caution	Equipment operating in a degraded condition
Alert	Equipment in need of repairs or replacement parts
Danger	Equipment has failed and/or is causing a safety hazard

XYZ Schools

Rough Order of Magnitude (ROM) Project Selection Matrix

Facility	Scenario #1 #2 #3 #4	FIM Code	Facility Improvement Measures (FIMs)	Asset Condition	District Priority	Funding Sources	Utility	Annual Savings O&M	Total	Rebate / Grant	Net Cost	Simple Payback
XYZ High School (cont.)		INT	Interior Spaces and Finishes									
		INT.1	Interior Door Replacement	Caution		LTFM						
		INT.2	Classroom Carpet Replacement	Caution		LTFM						
		INT.3	Media Center Carpet Replacement	Alert		LTFM						
		INT.4	Ceiling Grid Replacement	Alert		LTFM						
		INT.5	Plaster Wall Repair	Alert		LTFM						
		INT.6	Wall Repair	Caution		LTFM						
		INT.7	Vinyl Asbestos Tile Replacement	Caution		LTFM						
		INT.8	Repaint Lockers	Caution		LTFM						
		INT.9	Provide Markerboard Panels	Caution		LTFM						
		INT.10	Casework Refinishing	Alert		LTFM						
		INT.11	Nurse and Cafeteria Casework Replacement	Alert		LTFM						
		INT.12	Auditorium Seat Replacement	Alert		LTFM						
		INT.13	Restroom Partition Replacement	Alert		LTFM						
		INT.14	Window Blind Replacement	Caution		LTFM						
		LS	Life Safety Systems									
		LS.1	Install Sprinkler System	Danger		H&S						
		LS.2	Provide New Emergency Lighting	Danger		H&S						
		LS.3	Provide Additional Horn/Strobes	Alert		LTFM						
		LS.4	Modify/Replace Stair Guardrails	Alert		LTFM						
		LS.5	Modify Gym Guardrail	Alert		LTFM						
		LS.6	Provide New Kin Room Door	Caution		LTFM						
		M	Mechanical Systems									
		M.1a	Steam Trap Repair/Replacement - Bad Traps	Alert		LTFM						
		M.1b	Steam Trap Repair/Replacement - All Traps	Alert		LTFM						
		M.2	Valve, Pipe, and Accessory Fittings Insulation			EO						
		M.3a	Boiler Plant Improvements	Alert		LTFM						
		M.3b	Boiler Plant Replacement - Retain Steam	Alert		LTFM						
		M.3c	Boiler Plant Replacement - Convert to Hot Water	Alert		LTFM						
		M.4	Heating Distribution System - Convert to HW	Alert		H&S						
		M.5	Destratification Fans			EO						
		M.6	Chiller Plant Improvements	Caution		EO						
		M.7	Pool Equipment - Filtration Units, Water Heaters	Alert		LTFM						

Unesco provides a data-driven, condition assessment of facility assets. This column is a cross-reference to that analysis.

During the planning process, Unesco will guide an iterative process where district stakeholders use criteria based on baseline needs and priorities to develop site-based phasing of projects. The result of these efforts is a long-range facility plan.

Unesco has significant experience working with all of the funding mechanisms available to districts for facility revitalization / enhancement. This column illustrates funding mechanisms over which the School Board has authority.

Key for District Prioritization

Priority	When
1	Immediate
2	High
3	Medium
4	Low
5	Long Term

Key for Asset Condition

Asbestos	Equipment in satisfactory condition and minor useful life
Caution	Equipment operating in a degraded condition
Alert	Equipment in need of repairs or replacement parts
Danger	Equipment has failed and/or is causing a safety hazard

Scenario	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
2	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
3	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
4	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
5	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

XYZ Schools

Rough Order of Magnitude (ROM) Project Selection Matrix

Asset Condition	Rebate / Grant	Net Cost	Simple Payback
Good	None	High	Long
Fair	Low	Medium	Medium
Poor	High	Low	Short
Very Poor	None	High	Long

Facility	Scenario #1 #2 #3 #4	FIM Code	Facility Improvement Measures (FIMs)	Asset Condition	District Priority	Funding Sources	Utility	Annual Savings O&M	Total	Rebate / Grant	Net Cost	Simple Payback
XYZ High School (cont.)		P	Plumbing Systems									
		P.1	Domestic Water Fixture Efficiency Improvements	Alert		EO						
		P.2	Domestic Hot Water Piping Replacement - Vertical Runs	Alert		LTFM						
		P.3	Domestic Hot Water Piping Replacement - Horizontal Runs	Alert		LTFM						
		P.4	Domestic Cold Water Piping Replacement - Vertical Runs	Caution		LTFM						
		P.5	Domestic Cold Water Piping Replacement - Horizontal Runs	Alert		LTFM						
		P.6	Waste Delivery System Piping Replacement - Vertical Runs	Acceptable		LTFM						
		P.7	Waste Delivery System Piping Replacement - Horizontal Runs	Caution		LTFM						
		P.8	Kitchen Freezer Once-Through Cooling System Replacement	Danger		EO						
		PROG	Programmatic / Educational Adequacy Enhancements									
		PROG.1	Robotics Addition			LL						
		PROG.2	Pre-School Addition			LL						
		PROG.3	Media Center Remodel									
		PROG.4	Cafeteria Serving Line Remodel									
		S	Electronic Security Systems									
		S.1	Security System Server									
		S.2	Access Control Systems									
		S.3	IP Cameras									
		T	Technology Systems - Non-Instructional									
		T.1	Intercom System Replacement	Alert								
		T.2	Atomic Clock Upgrade	Acceptable								
		T.3	VOIP Telephony Upgrade	Caution								
		T.4	Server Room Upgrade	Caution								
		T.5	Inter-building Fiber Optic Network	Acceptable								
		T.6	Audio Visual Systems	Caution								
		T.7	Sound System - Auditorium	Alert								
		T.8	Scoreboards	Alert								
		U	Utility Service Improvements									
		U.1	Lucid BuildingOS Cloud Platform			EO						
		U.2	Utility Sub-Metering and Energy Dashboard			EO						
		U.3	Convert Interruptible Natural Gas Service (Propane Air)			EO						
		U.4	Increase main water service from 3" to 6"									
		U.5	Add on-site generation									
		U.6	Solar panel installation			EO						

Unesco's Certified Energy Managers (CEMs) and Professional Engineers (PEs) will identify many opportunities to optimize utility and operational cost. General fund savings associated with FIMs will be reflected in these columns.

Unesco will identify rebate and grant incentives associated with FIMs. This column reflects those opportunities.

Simple Payback is a simplistic, easy to understand measure of financial return on investment. Simple payback, in short, is the number of years needed to recover the initial cost/investment. This applies to FIMs with operational cost savings.

Key for Asset Condition

Rough Order of Magnitude (ROM) Project Selection Matrix

Key for District Prioritization		
	Priority	When
1	Immediate	2016
2	High	2017
3	Medium	3 to 5 years
4	Low	6 to 10 years
5	Long-Term	10+ Years

Asset Condition	Key for Asset Condition
Acceptable	Equipment in acceptable condition and within useful life
Minor	Equipment operating in a degraded condition
Major	Equipment in need of repairs or eventually past life
Danger	Equipment failure is inevitable
Obsolete	Equipment has failed and/or is causing a safety hazard

Facility	Scenario				FIM Code	Facility Improvement Measures (FIMs)	Asset Condition	District Priority	Funding Sources	Annual Savings			Rebate / Grant	Net Cost	Simple Payback	
	#1	#2	#3	#4						Utility	O&M	Total				
XYZ High School (cont.)					V	Ventilation / Dehumidification Systems										
					V.1	Ventilation Assessment and Pre-Engineering/Pre-Design			H&S							
					V.2a	Replace AHU-1; VAV Central Air Distribution; No Dehumidification	Alert		H&S							
					V.2b	Replace AHU-1, VAV, Chilled Water Dehumidification	Alert		H&S							
					V.2c	Replace AHU-1, Chilled Beam Dehumidification/Ventilation	Alert		H&S							
					V.3	Kitchen Hood and Make-Up System	Alert		H&S							
					PDC&B - Project Development, Commissioning & Bonds											
	X				PDC&B.1	Project Development, Commissioning & Bonds - Scen #1			EO							
		X			PDC&B.2	Project Development, Commissioning & Bonds - Scen #2			EO							
			X		PDC&B.3	Project Development, Commissioning & Bonds - Scen #3			EO							
				X	PDC&B.4	Project Development, Commissioning & Bonds - Scen #4			EO							
	Project Summary															
Financial Impact	X					Scenario#1 Total										
		X				Scenario#2 Total										
			X			Scenario#3 Total										
				X		Scenario#4 Total										

Long-Range Facilities Plan

During the planning process, Unesco will guide an iterative process where district stakeholders use criteria based on baseline needs and priorities to develop site-based phasing of projects. The result of these efforts is a long-range facility plan. The long-range plan is illustrated in tools as simple as Excel spreadsheets, and as sophisticated as cloud-based, client accessible databases.

Summary of Identified Facility Needs

[illegible]

Financial Relativity

Pay 2017 Taxation Information

District # District Name
2342 West Central Area



DISTRICT FACTS - LEVY 2015 / PAY 2016 / FISCAL YEAR 2017

			Initial Levy	Levy w / Adj.	Tax Rate
RMV Excluding JOBZ	268,357,900	GENERAL RMV VOTER	1,163,558.59	1,163,558.59	0.43359%
RMV JOBZ	-	GENERAL RMV OTHER	249,375.03	249,375.03	0.09293%
		Total	1,412,933.62	1,412,933.62	0.52652%
NTC Excluding JOBZ	11,774,072	GENERAL NTC VOTER	-	-	0.000%
NTC JOBZ	-	STUDENT ACHIEVEMENT NTC	38,845.73	21,311.97	0.182%
INITIAL SPREAD LEVY \$	2,092,081	GENERAL NTC OTHER	426,651.77	426,651.77	3.624%
TOTAL SPREAD LEVY \$	2,074,547	COMMUNITY SERV NTC	83,125.05	83,125.05	0.707%
		GENERAL DEBT SERV VOTER APPROVED	-	-	0.000%
		GENERAL DEBT SERV OTHER	130,524.84	130,524.84	1.109%
		OPEB/PENSION DEBT VOTER APPROVED	-	-	0.000%
		OPEB/PENSION DEBT OTHER	-	-	0.000%
		Total	679,147.39	661,613.63	5.622%

PROPERTY TAX IMPACT EXAMPLES ON VARIOUS TYPES AND SIZES OF PROPERTIES

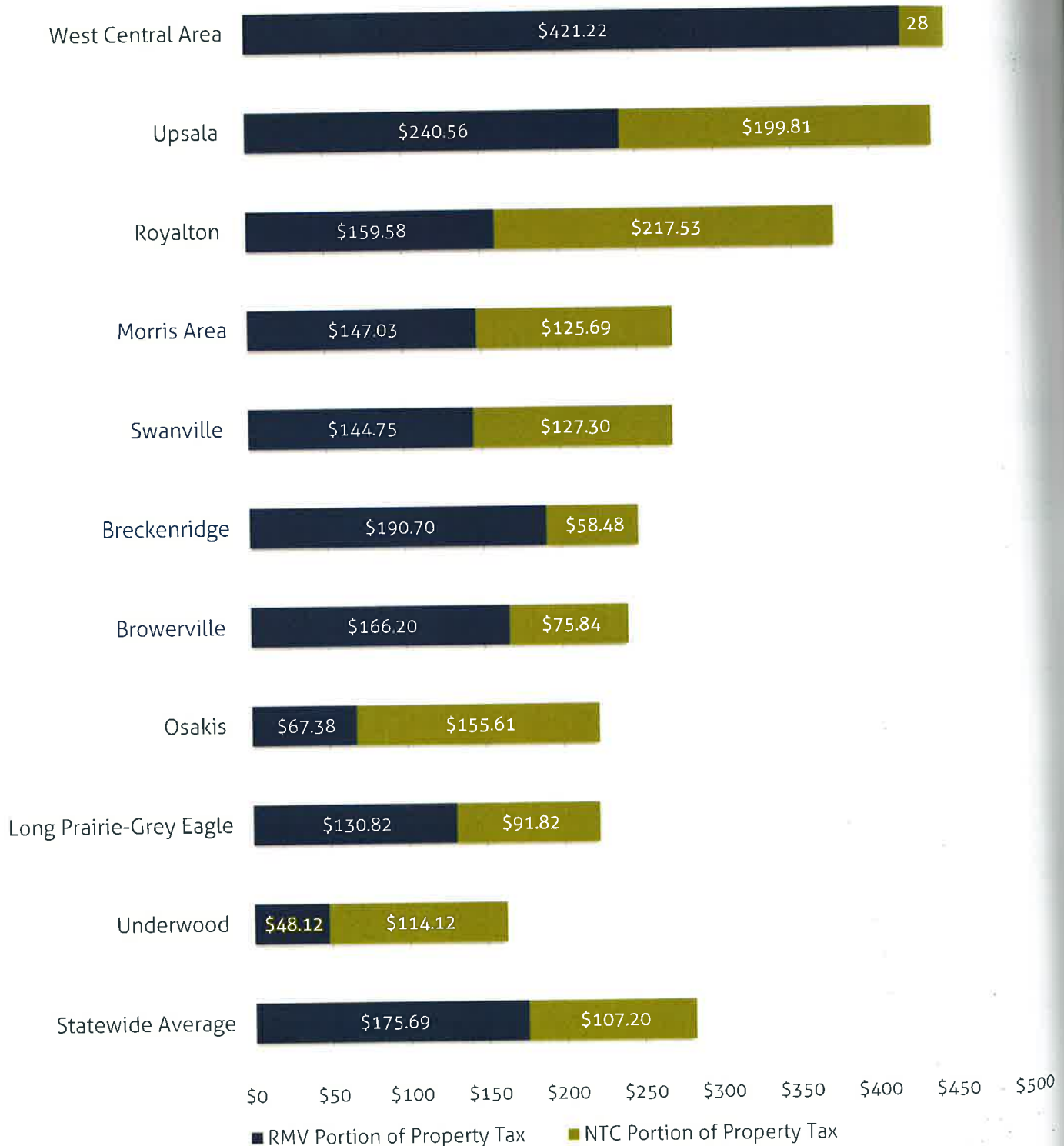
PROPERTY TAX IMPACT INFORMATION

Types of Property		Estimated Market Value	RMV	NTC	Annual Total	Monthly Total
Residential Homestead		\$50,000	\$263.26	\$16.87	\$280.13	\$23.34
		70,000	368.56	23.61	392.18	32.68
		100,000	526.52	40.37	566.89	47.24
		125,000	658.15	55.66	713.81	59.48
		150,000	789.78	71.01	860.79	71.73
		200,000	1,053.04	101.65	1,154.69	96.22
		250,000	1,316.30	132.29	1,448.59	120.72
Commercial / Industrial		\$250,000	\$1,316.30	\$238.94	\$1,555.24	\$129.60
		500,000	2,632.60	520.04	3,152.64	262.72
		750,000	3,948.90	801.14	4,750.04	395.84
		1,000,000	5,265.20	1,082.24	6,347.44	528.95
Agricultural Homestead	40 acres	512,000	\$1,053.04	\$188.90	\$1,241.94	\$103.49
	80 acres	832,000	1,053.04	278.85	1,331.89	110.99
	160 acres	1,472,000	1,053.04	458.76	1,511.80	125.98
	320 acres	2,752,000	1,053.04	934.38	1,987.42	165.62
Agricultural Non-Homestead (dollars per acre)		\$2,000	\$0.00	\$1.12	\$1.12	\$0.09
		4,000	0.00	2.25	2.25	0.19
		6,000	0.00	3.37	3.37	0.28
		8,000	0.00	4.50	4.50	0.37
		10,000	0.00	5.62	5.62	0.47

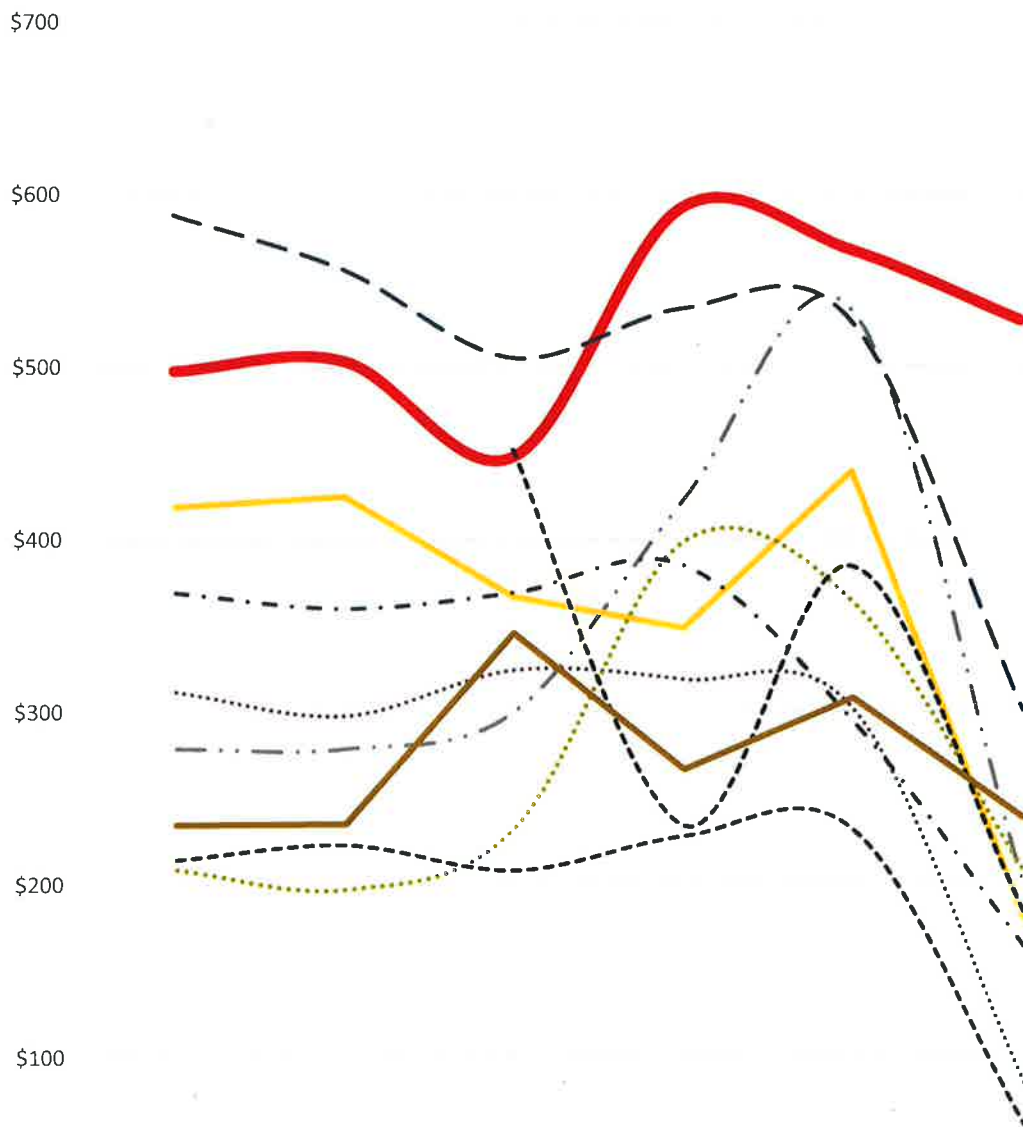
Please note: the acronyms RMV and NTC refer to Referendum Market Value and Net Tax Capacity, respectively.

Comparing with Peer Districts

School Portion of Property Taxes Payable in 2017 on a \$80,000 Homestead Residential Property

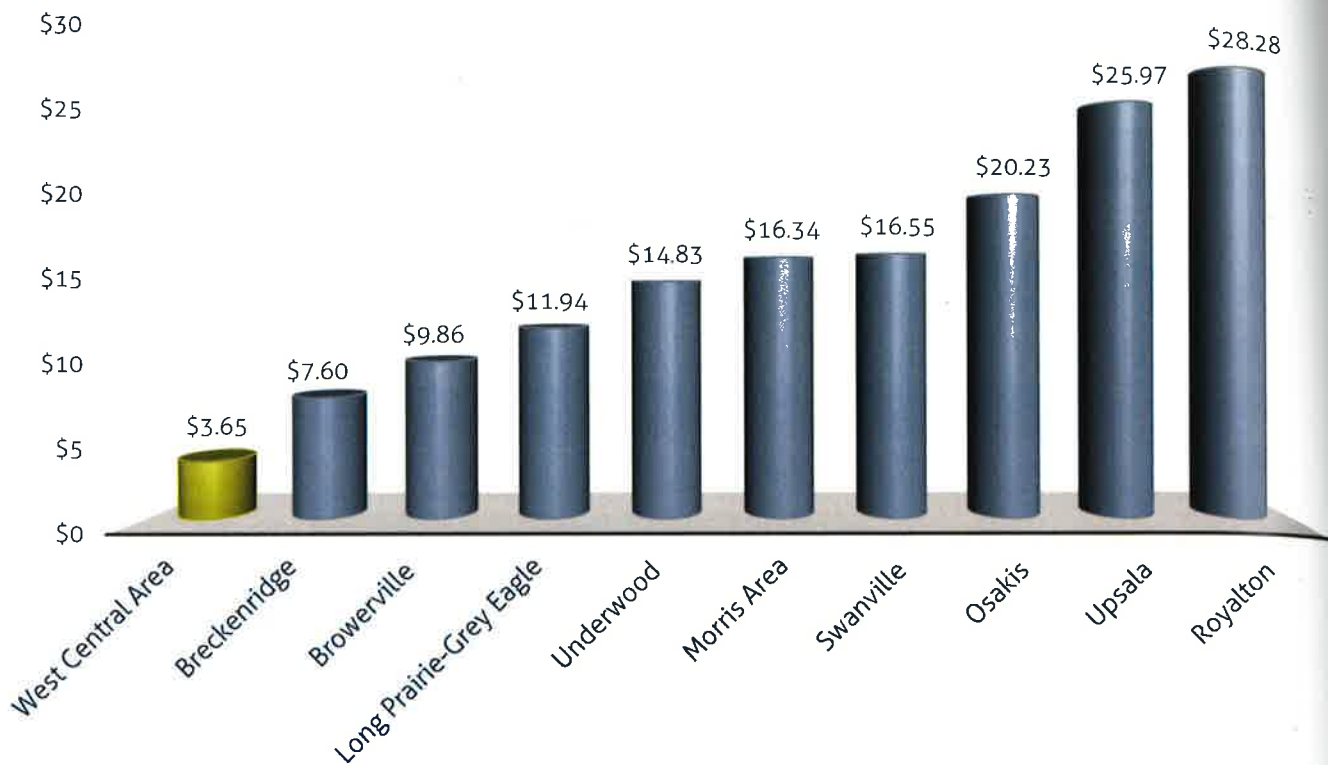


School Levy Impact on \$100K Homestead Residence

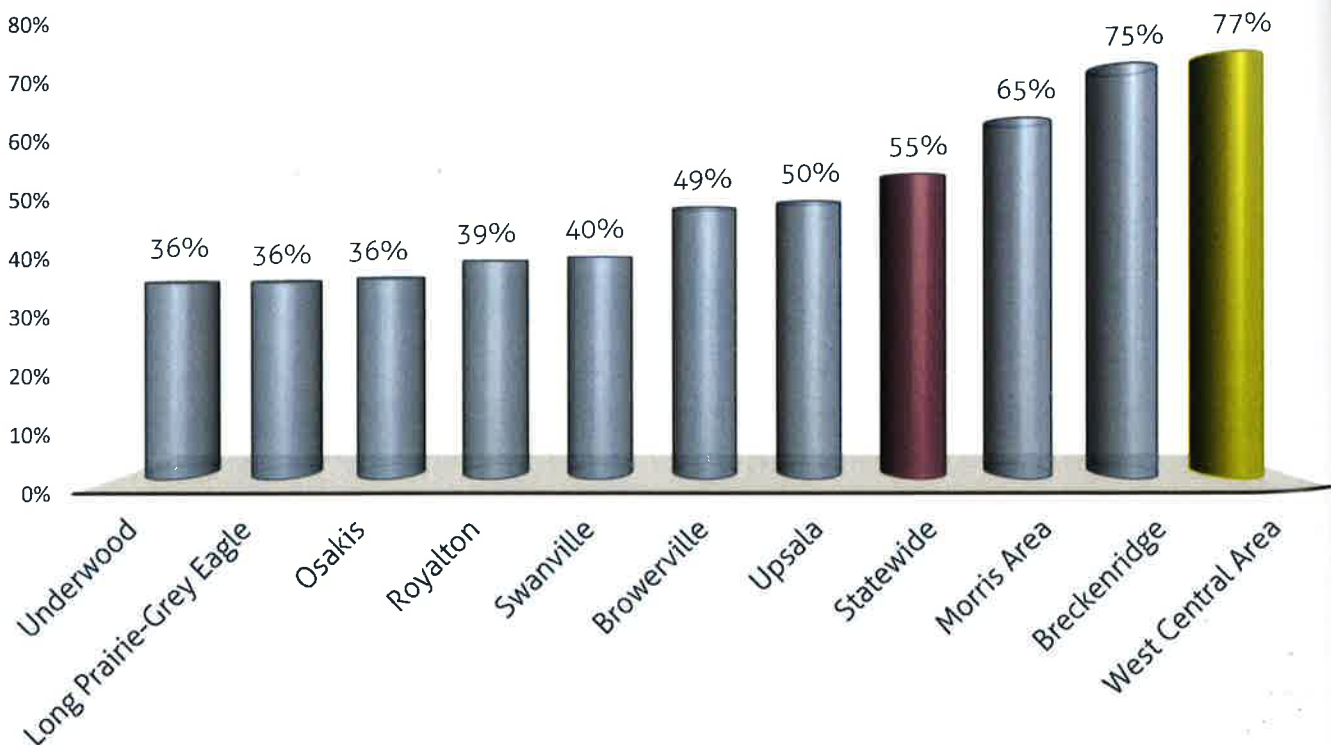


	Pay 2012	Pay 2013	Pay 2014	Pay 2015	Pay 2016	Pay 2017
West Central Area	\$498	\$504	\$448	\$592	\$568	\$527
Osakis	\$312	\$298	\$325	\$319	\$302	\$84
Royalton	\$279	\$279	\$301	\$422	\$533	\$199
Swanville	\$419	\$425	\$367	\$349	\$439	\$181
Upsala	\$588	\$557	\$505	\$533	\$526	\$301
Browerville	\$209	\$198	\$233	\$398	\$364	\$208
Long Prairie-Grey Eagle	\$369	\$360	\$369	\$385	\$294	\$164
Morris Area			\$452	\$234	\$384	\$184
Underwood	\$215	\$223	\$208	\$228	\$231	\$60
Breckenridge	\$235	\$235	\$346	\$267	\$308	\$238

School Portion of Property Taxes Payable in 2017 on a 1-acre Non-homestead Agricultural Property valued at \$6,500



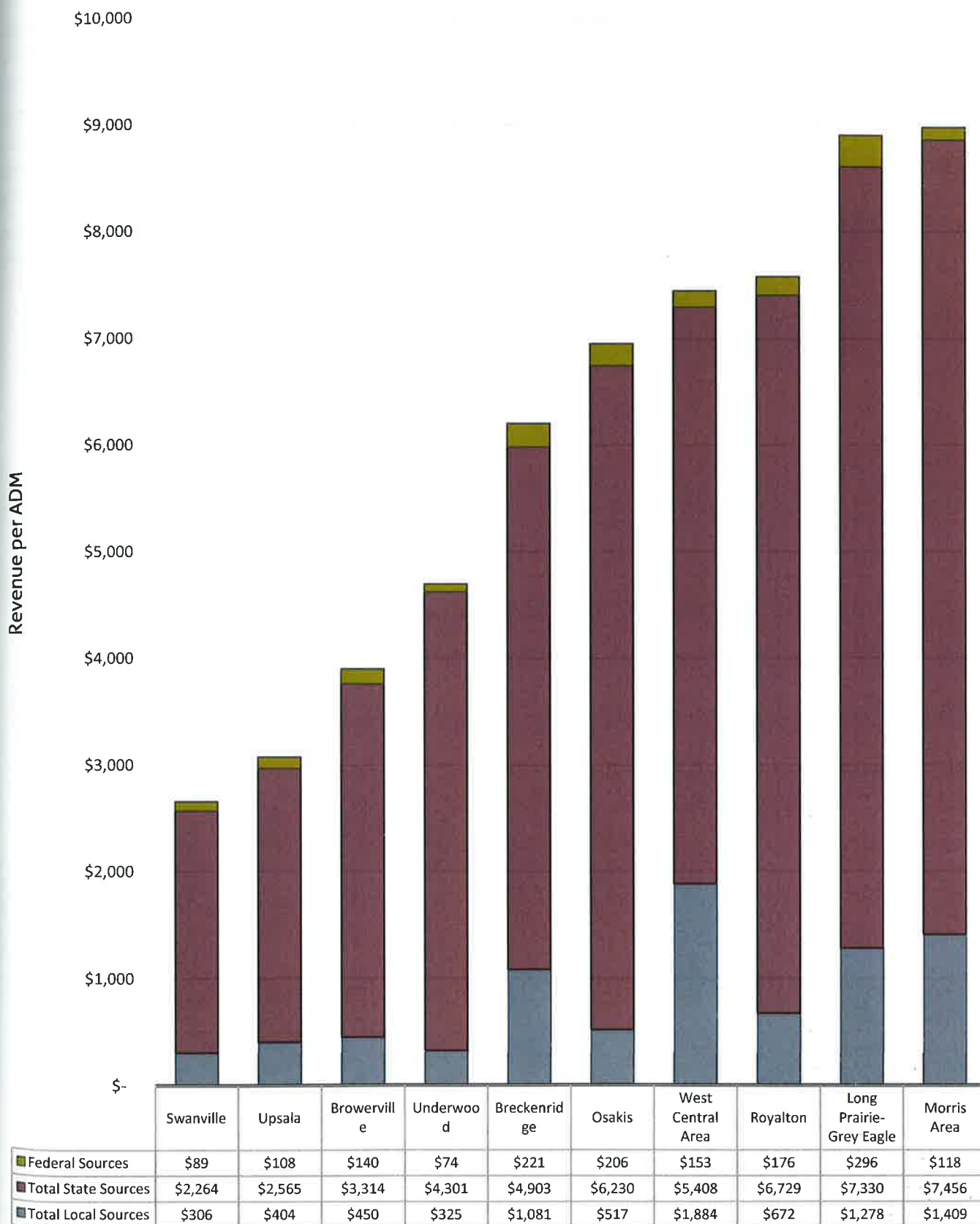
% Agriculture of Net Tax Capacity



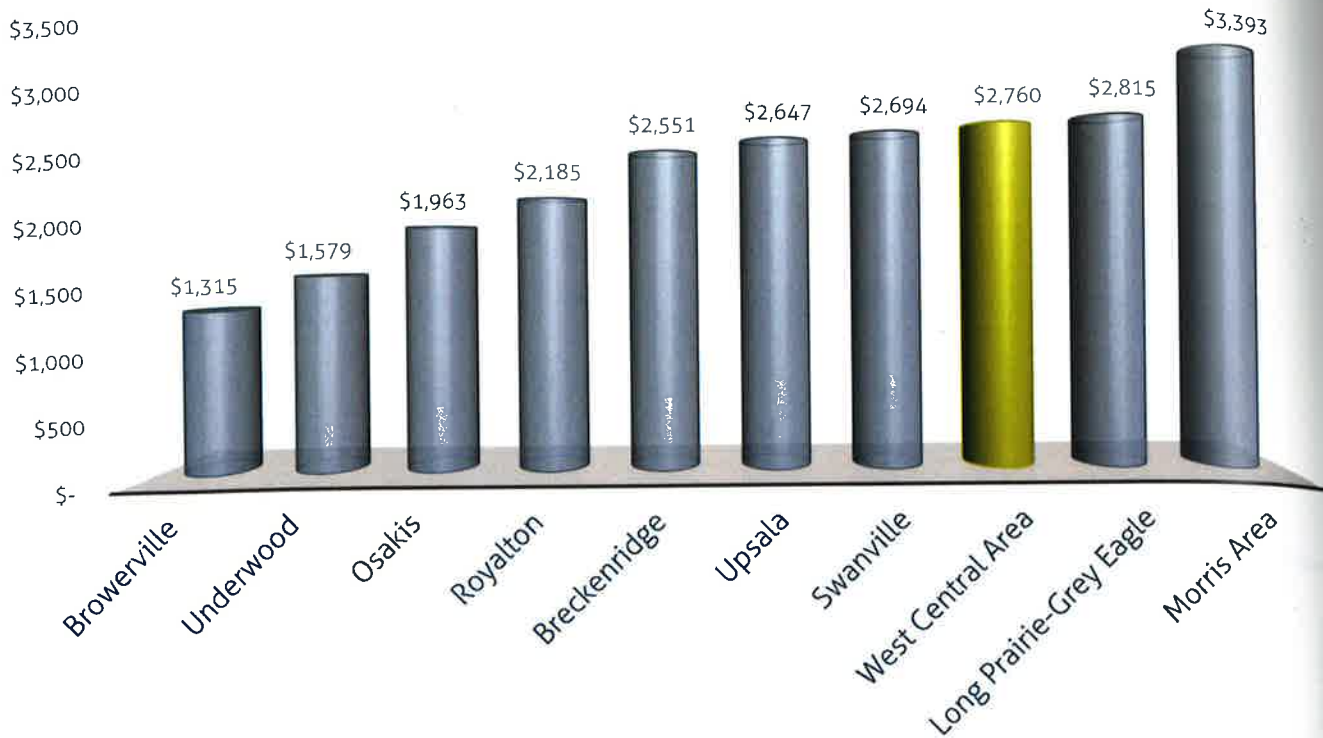
Revenue per ADM

Feder
Total
Total

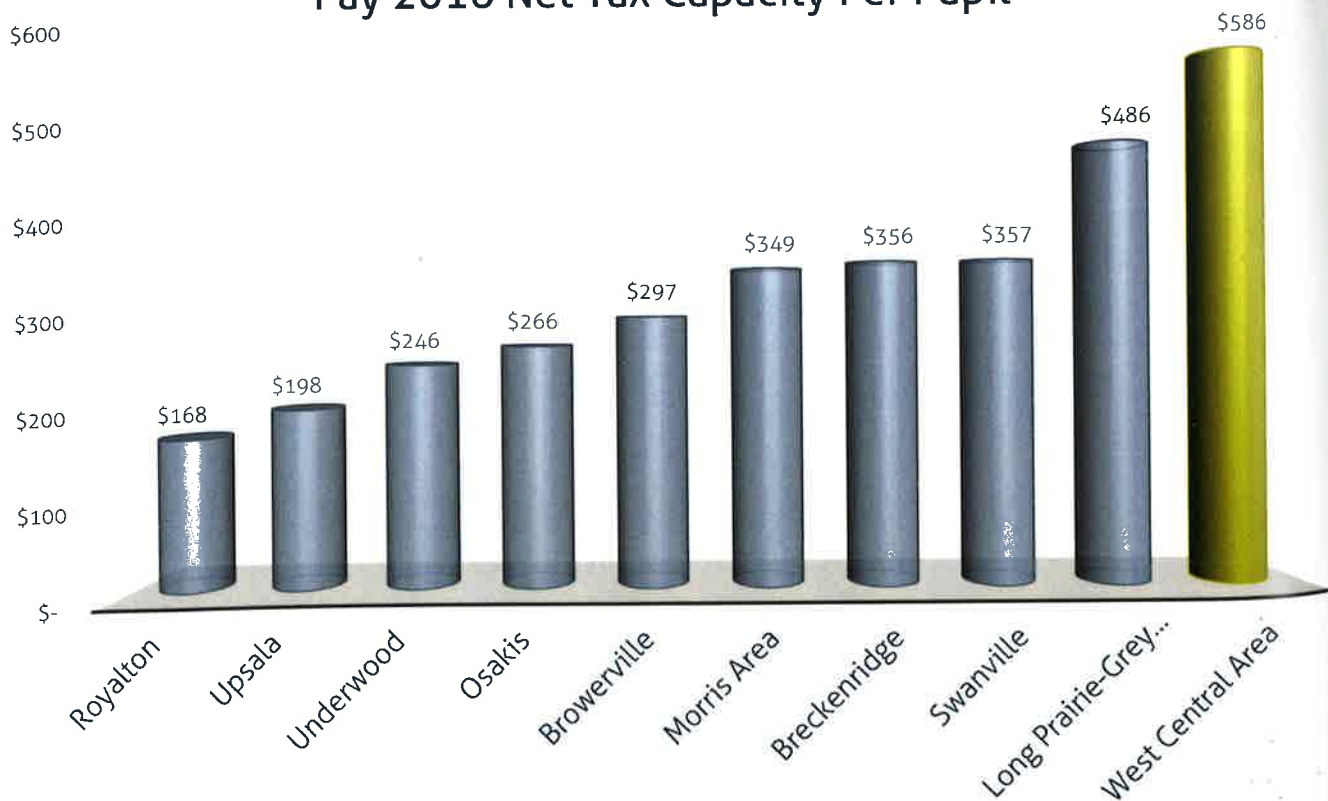
2014-15 Revenue per ADM



Pay 2016 School Levy per ADM



Pay 2016 Net Tax Capacity Per Pupil



Financial
Unesco, Inc. ma
Exchange Rule
Informational a
Unesco, Inc. is
providing advic
respect to mun
Municipal Advi
Should there b
Advisor and/or

November 20, 2017

Financial Disclaimers – IRMA Disclosure

Unesco, Inc. may provide advice that may be considered to be Municipal Advisor advice as defined in Securities and Exchange Rule 15Ba1-1. Any municipal securities or financial products information provided is for general informational and educational purposes only.

Unesco, Inc. is not a Municipal Advisor and are not subject to the fiduciary duty required of Municipal Advisors when providing advice on municipal financial products or issuance of municipal securities. Any advice provided by us with respect to municipal financial products or issuance of municipal securities should be discussed with your registered Municipal Advisor before taking any action.

Should there be questions or concerns about Unesco, Inc.'s role in this project, talk immediately with your Municipal Advisor and/or seek appropriate legal advice.

West Central Area School District

Preliminary Financial Analysis

November 20, 2017





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Scenario 1

Energy Funds Capital Improvements

Scenario 1

Facility Improvements:

\$1,100,000

Capital Investment:

\$0.00

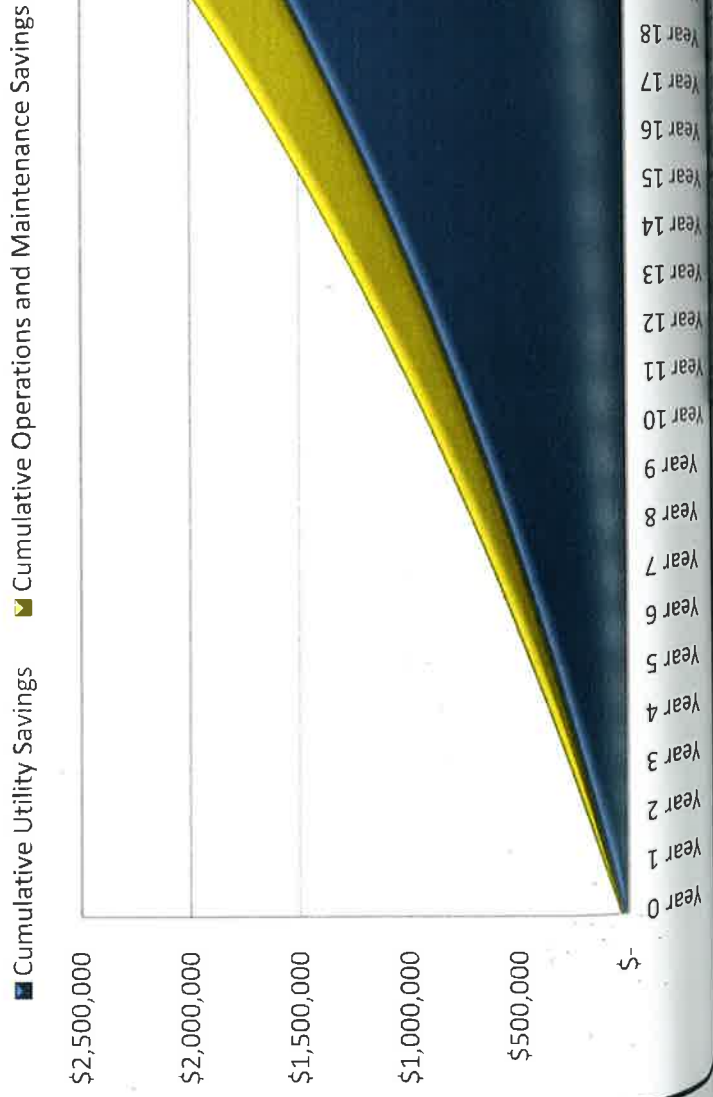
Impact on Taxpayers:

\$0.00

Financial Risk:

\$0.00

Savings Over Time



Annual District-Wide Utility Cost



Cash Flow Analysis - Scenario 1

CAPITAL INVESTMENT

\$

\$ 1,100,000

\$

3rd Party Financing	3.00%	15	\$	1,100,000
Facility Maintenance Bonds	2.50%	0	\$	-
Facility Maintenance Bonds (IAQ)	2.50%	0	\$	-

Year 0 Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10 Year 11 Year 12 Year 13 Year 14 Year 15 Year 16 Year 17 Year 18 Year 19 Year 20

Current Post-Project

Cash Flow Analysis - Scenario 1

3rd Party Financing	3.00%	15	\$	1,100,000
Facility Maintenance Bonds	2.50%	0	\$	-
Facility Maintenance Bonds (IAQ)	2.50%	0	\$	-
G.O. Building Bonds	2.75%	0	\$	-
Abatement Bonds	3.50%	15	\$	-
Certificates of Participation	3.75%	15	\$	-

CAPITAL INVESTMENT	\$	1,100,000
Grants	\$	-
Capital Buy-Down	\$	-
NET INVESTMENT FINANCED	\$	1,100,000

YEARS	PROJECT FUNDING					EXPENSES					CASH FLOW ANALYSIS		
	Utility Savings	Operational Savings	Escrow Interest Earnings	Rebates	3rd Party Financing	Facility Maintenance Bonds	G.O. Building Bonds	Abatement Bonds	Certificates of Participation	Technical Resource Services	Annual Cash Flow	Cumulative Cash Flow	
Year 0	\$ 19,314	\$ 15,000	\$ 5,500	\$ 5,800	\$ (33,000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,614	\$ 12,614	
Year 1	\$ 58,000	\$ 15,563	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ (7,200)	\$ (23,097)	\$ (10,483)	
Year 2	\$ 60,175	\$ 16,146	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ (7,470)	\$ (20,608)	\$ (31,091)	
Year 3	\$ 62,432	\$ 16,752	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ (7,750)	\$ (18,026)	\$ (49,118)	
Year 4	\$ 64,773	\$ 17,380	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (7,307)	\$ (56,425)	
Year 5	\$ 67,202	\$ 18,031	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (4,226)	\$ (60,651)	
Year 6	\$ 69,722	\$ 18,708	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (1,030)	\$ (61,681)	
Year 7	\$ 72,336	\$ 19,409	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,286	\$ (59,395)	
Year 8	\$ 75,049	\$ 20,137	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,727	\$ (53,668)	
Year 9	\$ 77,863	\$ 20,892	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,296	\$ (44,372)	
Year 10	\$ 80,783	\$ 21,676	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12,999	\$ (31,373)	
Year 11	\$ 83,813	\$ 22,488	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 16,842	\$ (14,531)	
Year 12	\$ 86,956	\$ 23,332	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20,828	\$ 6,297	
Year 13	\$ 90,216	\$ 24,207	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 24,964	\$ 31,260	
Year 14	\$ 93,599	\$ 25,115	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 29,255	\$ 60,515	
Year 15	\$ 97,109	\$ 26,056	\$ -	\$ -	\$ (89,459)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 33,706	\$ 94,221	
Year 16	\$ 100,751	\$ 27,033	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 127,784	\$ 222,006	
Year 17	\$ 104,529	\$ 28,047	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 132,576	\$ 354,582	
Year 18	\$ 108,449	\$ 29,099	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 137,548	\$ 492,130	
Year 19	\$ 112,516	\$ 30,190	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 142,706	\$ 634,836	
Year 20	\$ 116,735	\$ 31,322	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 148,058	\$ 782,894	
TOTALS	\$ 1,702,322	\$ 466,583	\$ 5,500	\$ 5,800	\$ (1,374,892)	\$ -	\$ -	\$ -	\$ -	\$ (22,420)	\$ 782,894	\$ 782,894	





Scenario 2

Bonded Earmark of Existing LTFM Revenue

Scenario 2 Summary

Leverage Utility and
Operational Cost
Savings

Bonded LTFM Revenue

- 15 year earmark of existing revenue
- 40% Ag2School credit for agriculture property

Financial Summary

Total Value of Facility Reinvestment:	\$2,200,000
Grants/Rebates:	\$ -
Capital Buy-Down	\$ -
Net Investment Financed	\$2,200,000
Total LTFM Debt Equalization from State of MN:	\$ -
Annual Contribution from General Fund:	\$ -
Annual Tax Impact on \$80K Home:	\$ -
Annual Tax Impact on 320 acres Ag. Homestead:	\$ -
Annual Tax Impact on Ag., Non-Homestead Acre valued at \$6500 (\$/acre):	\$ -

Sources of Funding



CAPITAL INVESTMENT	\$	2,200,000
Grants	\$	-

Cash Flow Analysis - Scenario 2

3rd Party Insurance	3.00%	15	\$	3,300,000
Facility Maintenance Bonds	2.50%	15	\$	3,300,000
Facility Maintenance Bonds (AQ)	2.50%	15	\$	-
G.O. Building Bonds	2.75%	0	\$	-
Abatement Bonds	3.50%	15	\$	-

CAPITAL INVESTMENT	\$	2,200,000
Grants	\$	-
Capital Buy-Down	\$	-
NET INVESTMENT FINANCED	\$	2,200,000

YEARS		PROJECT FUNDING							EXPENSES					CASH FLOW ANALYSIS	
	Utility Savings	Operational Savings	Escrow Interest Earnings	Rebates	Capital Contribution	(Referendum) Debt Service Levy	Tax Abatement Levy	3rd Party Financing	Facility Maintenance Bonds	G.O. Building Bonds	Abatement Bonds	Certificates of Participation	Technical Resource Services	Annual Cash Flow	Cumulative Cash Flow
Year 0	\$ 19,314	\$ 15,000	\$ 11,000	\$ 5,800	\$ -	\$ -	\$ -	\$ (33,000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 18,114	\$ 18,114
Year 1	\$ 58,000	\$ 15,563	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ (7,200)	\$ (23,097)	\$ (4,983)
Year 2	\$ 60,175	\$ 16,146	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ (7,470)	\$ (20,608)	\$ (25,591)
Year 3	\$ 62,432	\$ 16,752	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ (7,750)	\$ (18,026)	\$ (43,618)
Year 4	\$ 64,773	\$ 17,380	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ (7,307)	\$ (50,925)
Year 5	\$ 67,202	\$ 18,031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ (4,226)	\$ (55,151)
Year 6	\$ 69,722	\$ 18,708	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ (1,030)	\$ (56,181)
Year 7	\$ 72,336	\$ 19,409	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 2,286	\$ (53,895)
Year 8	\$ 75,049	\$ 20,137	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 5,727	\$ (48,168)
Year 9	\$ 77,863	\$ 20,892	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 9,296	\$ (38,872)
Year 10	\$ 80,783	\$ 21,676	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 12,999	\$ (25,873)
Year 11	\$ 83,813	\$ 22,488	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 16,842	\$ (9,031)
Year 12	\$ 86,956	\$ 23,332	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 20,828	\$ 11,797
Year 13	\$ 90,216	\$ 24,207	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 24,964	\$ 36,760
Year 14	\$ 93,599	\$ 25,115	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 29,255	\$ 66,015
Year 15	\$ 97,109	\$ 26,056	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (90,389)	\$ -	\$ -	\$ -	\$ -	\$ 33,706	\$ 99,721
Year 16	\$ 100,751	\$ 27,033	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 127,784	\$ 227,506
Year 17	\$ 104,529	\$ 28,047	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 132,576	\$ 360,082
Year 18	\$ 108,449	\$ 29,099	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 137,548	\$ 497,630
Year 19	\$ 112,516	\$ 30,190	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 142,706	\$ 640,336
Year 20	\$ 116,735	\$ 31,322	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 148,058	\$ 788,394
TOTALS	\$ 1,702,322	\$ 466,583	\$ 11,000	\$ 5,800	\$ -	\$ -	\$ -	\$ (1,374,892)	\$ (1,328,114)	\$ -	\$ -	\$ -	\$ (22,420)	\$ 788,394	\$ 788,394

West Central Area School District Scenario 2 Levy Impact Summary

Period	Existing Levies				New Referendum Projects				New Health and Safety Projects				New Bonded Deferred Maintenance Projects				Other New Levies		Total Combined Levy
	Tax Pay Year	Pay As You Go LTFM Levy	Debt Service Levy	Abatement Levy	Lease Levy	New G.O. Bond Principal	New G.O. Bond Interest	New G.O. Bond Levy	H&S Bond Principal	H&S Bond Interest	New H&S Bond Levy	LTFM Bond Principal	LTFM Bond Interest	New LTFM Bond P&I	MM Debt Equalization Aid	Bonded LTFM Levy	New Tax Abatement Levy	New Lease Levy	
0	2017	\$ 90,389	\$ 207,270	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 301,050
1	2018	\$ -	\$ 203,490	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 62,889	\$ 27,500	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 297,270
2	2019	\$ -	\$ 204,960	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 64,461	\$ 25,928	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 298,740
3	2020	\$ -	\$ 206,325	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 66,073	\$ 24,316	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 300,105
4	2021	\$ -	\$ 144,585	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 67,725	\$ 22,664	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 238,365
5	2022	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 69,418	\$ 20,971	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
6	2023	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 71,153	\$ 19,236	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
7	2024	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 72,932	\$ 17,457	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
8	2025	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 74,755	\$ 15,634	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
9	2026	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 76,624	\$ 13,765	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
10	2027	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 78,540	\$ 11,849	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
11	2028	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 80,503	\$ 9,886	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
12	2029	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 82,516	\$ 7,873	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
13	2030	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 84,579	\$ 5,810	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
14	2031	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 86,693	\$ 3,696	\$ 90,389	\$ -	\$ 90,389	\$ -	\$ -	\$ 93,780
15	2032	\$ 27,721	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 88,856	\$ 1,528	\$ 62,668	\$ -	\$ 62,668	\$ -	\$ -	\$ 93,780
16	2033	\$ 90,389	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,780
17	2034	\$ 90,389	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,780
18	2035	\$ 90,389	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,780
19	2036	\$ 90,389	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,780
20	2037	\$ 90,389	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,780
21	2038	\$ 90,389	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 93,780

LTFM Revenue Summary



\$350,000

\$300,000

\$250,000

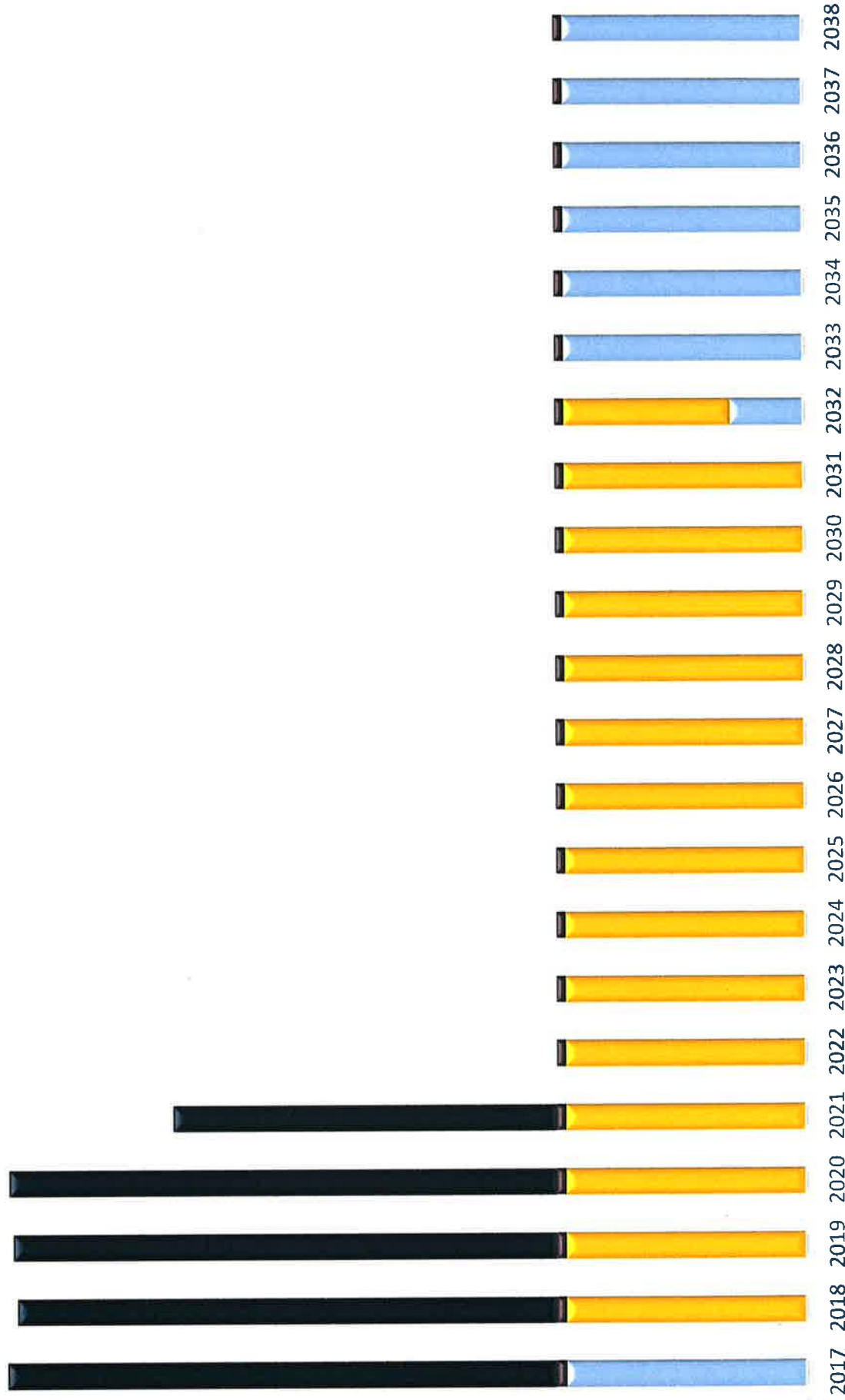
\$200,000

\$150,000

\$100,000

\$50,000

\$-



Pay As You Go LTFM Levy

New Tax Abatement Levy

Bonded LTFM Levy

New Lease Levy

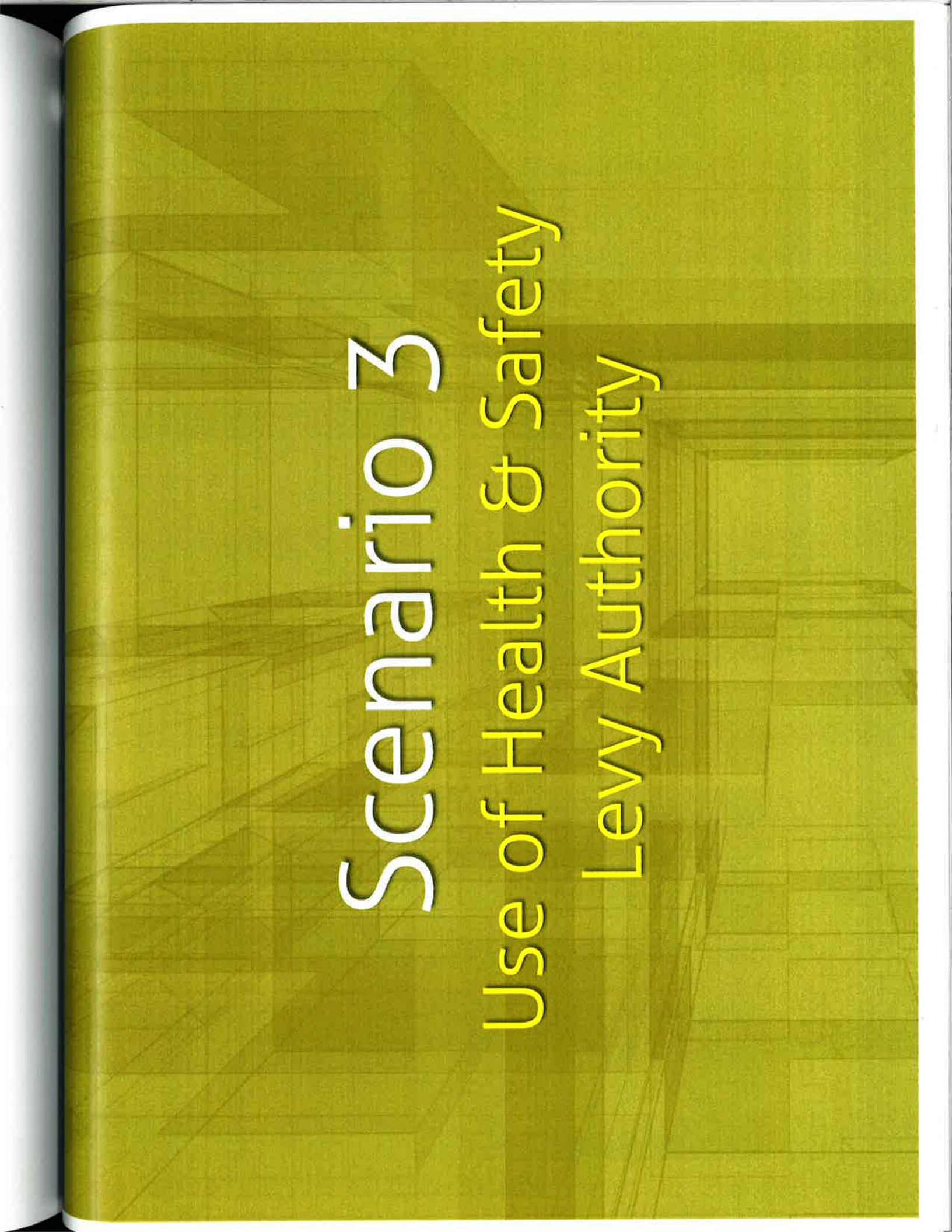
Lease Levy

New H&S Bond Levy

Tax Abatement Levy

New G.O. Bond Levy

Debt Service Levy



Scenario 3

Use of Health & Safety Levy Authority

Leverage Utility and Operational Cost Savings

**Bonded LTFM Revenue
(\$3 million) for
Deferred Maintenance**

- 15 year earmark of 81% of the LTFM revenue authority

- 15 year earmark of 81% of the LTFM revenue authority

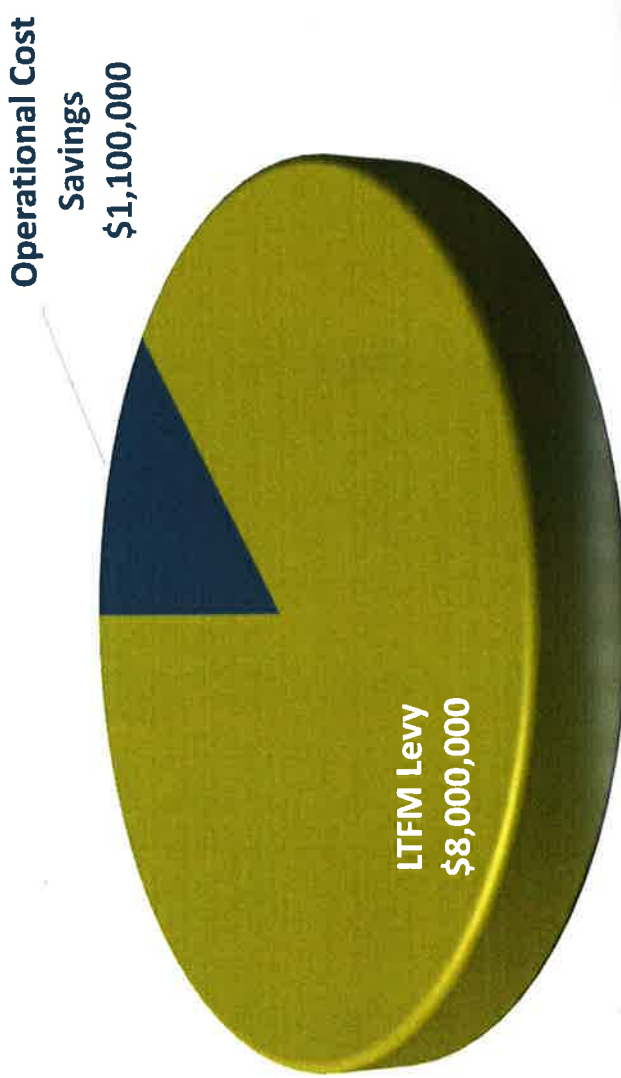
Use of Health and Safety Levy Authority (\$5 million) for IAQ Improvements

CAPITAL INVESTMENT	\$	9,100,000
Grants	\$	-
Capital Buy-Down	\$	-

Financial Summary

Total Value of Facility Reinvestment:	\$ 9,100,000
Grants/Rebates:	\$ -
Capital Buy-Down	\$ -
Net Investment Financed	\$ 9,100,000
Total LTFM Debt Equalization from State of MN:	\$ -
Annual Contribution from General Fund:	\$ -
Annual Tax Impact on \$80K Home:	\$ 12.96
Annual Tax Impact on 320 acres Ag. Homestead:	\$ 184
Annual Tax Impact on Ag., Non-Homestead Acre valued at \$6500 (\$/acre):	\$ 1.01

Sources of Funding



2015 Priority Financing	Yield	YTD	YTD
Facility Maintenance Bonds	2.50%	20	\$ 3,000,000
Facility Maintenance Bonds (UAC)	2.50%	20	\$ 5,000,000
G.O. Building Bonds	2.75%	0	\$ -
Abatement Bonds	3.50%	15	\$ -
Certificates of Participation	3.75%	15	\$ -

Improvements

CAPITAL INVESTMENT	\$	9,100,000
Grants	\$	-
Capital Buy-Down	\$	-
NET INVESTMENT FINANCED	\$	9,100,000

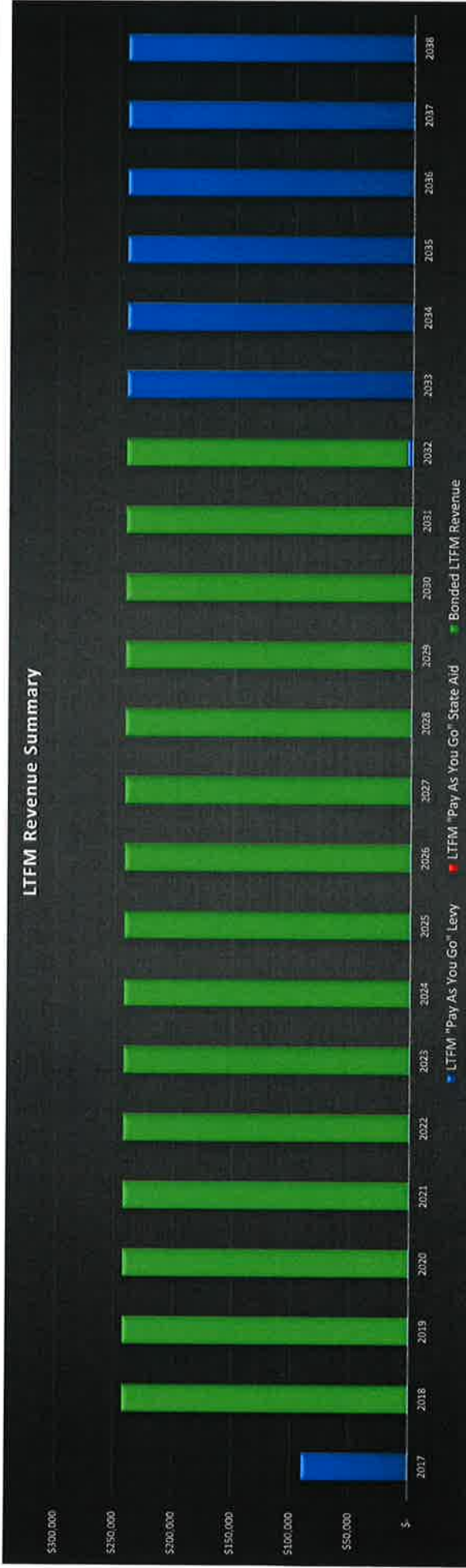
3rd Party Financing	1.00%	15	\$	1,374,892
Facility Maintenance Bonds (IAC)	2.50%	20	\$	5,000,000
G.O. Building Bonds	2.75%	0	\$	-
Abatement Bonds	3.50%	15	\$	-
Certificates of Participation	3.75%	15	\$	-

YEARS		PROJECT FUNDING							EXPENSES					CASH FLOW ANALYSIS		
	Utility Savings	Operational Savings	Escrow Interest Earnings	Rebates	Capital Contribution	(Referendum) Debt Service Levy	Tax Abatement Levy	Lease Levy	3rd Party Financing	Facility Maintenance Bonds	G.O. Building Bonds	Abatement Bonds	Certificates of Participation	Technical Resource Services	Annual Cash Flow	Cumulative Cash Flow
Year 0	\$ 19,314	\$ 15,000	\$ 45,500	\$ 5,800	\$ -	\$ -	\$ -	\$ -	\$ (33,000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 52,614	\$ 52,614
Year 1	\$ 58,000	\$ 15,563	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (405,776)	\$ -	\$ -	\$ -	\$ (7,200)	\$ (23,097)	\$ 29,517
Year 2	\$ 60,175	\$ 16,146	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (404,306)	\$ -	\$ -	\$ -	\$ (7,470)	\$ (20,608)	\$ 8,909
Year 3	\$ 62,432	\$ 16,752	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (402,941)	\$ -	\$ -	\$ -	\$ (7,750)	\$ (18,026)	\$ (9,118)
Year 4	\$ 64,773	\$ 17,380	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (404,681)	\$ -	\$ -	\$ -	\$ -	\$ (7,307)	\$ (16,425)
Year 5	\$ 67,202	\$ 18,031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ (4,226)	\$ (20,651)
Year 6	\$ 69,722	\$ 18,708	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ (1,030)	\$ (21,681)
Year 7	\$ 72,336	\$ 19,409	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 2,286	\$ (19,395)
Year 8	\$ 75,049	\$ 20,137	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 5,727	\$ (13,668)
Year 9	\$ 77,863	\$ 20,892	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 9,296	\$ (4,372)
Year 10	\$ 80,783	\$ 21,676	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 12,999	\$ 8,627
Year 11	\$ 83,813	\$ 22,488	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 16,842	\$ 25,469
Year 12	\$ 86,956	\$ 23,332	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 20,828	\$ 46,297
Year 13	\$ 90,216	\$ 24,207	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 24,964	\$ 71,260
Year 14	\$ 93,599	\$ 25,115	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (609,266)	\$ -	\$ -	\$ -	\$ -	\$ 29,255	\$ 100,515
Year 15	\$ 97,109	\$ 26,056	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (604,081)	\$ -	\$ -	\$ -	\$ -	\$ 33,706	\$ 134,221
Year 16	\$ 100,751	\$ 27,033	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (89,459)	\$ (366,677)	\$ -	\$ -	\$ -	\$ -	\$ 127,784	\$ 262,006
Year 17	\$ 104,529	\$ 28,047	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (366,677)	\$ -	\$ -	\$ -	\$ -	\$ 132,576	\$ 394,582
Year 18	\$ 108,449	\$ 29,099	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (366,677)	\$ -	\$ -	\$ -	\$ -	\$ 137,548	\$ 532,130
Year 19	\$ 112,516	\$ 30,190	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (366,677)	\$ -	\$ -	\$ -	\$ -	\$ 142,706	\$ 674,836
Year 20	\$ 116,735	\$ 31,322	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (366,677)	\$ -	\$ -	\$ -	\$ -	\$ 148,058	\$ 822,894
TOTALS	\$ 1,702,322	\$ 466,583	\$ 45,500	\$ 5,800	\$ -	\$ -	\$ -	\$ -	\$ (1,374,892)	\$ (10,207,827)	\$ -	\$ -	\$ -	\$ (22,420)	\$ 822,894	\$ 822,894

West Central Area School District Scenario 3 Levy Impact Summary

Period	Existing Levies				New Referendum Projects				New Health and Safety Projects				New Bonded Deferred Maintenance Projects				Other New Levies		Total Combined Levy
	Tax Year	Pay As You Go LTFM Levy	Debt Service Levy	Abatement Levy	Lease Levy	New G.O. Bond Principal	New G.O. Bond Interest	New G.O. Bond Levy	H&S Bond Principal	H&S Bond Interest	New H&S Bond Levy	LTFM Bond Principal	LTFM Bond Interest	New LTFM Bond P&I	MIN Debt Equalization Aid	Bonded LTFM Levy	New Tax Abatement Levy	New Lease Levy	
0	2017	\$ 90,389	\$ 207,270	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 301,050
1	2018	\$ -	\$ 203,490	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 38,187	\$ 125,000	\$ 163,187	\$ 167,589	\$ 75,000	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
2	2019	\$ -	\$ 204,960	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 37,672	\$ 124,045	\$ 161,717	\$ 171,778	\$ 70,810	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
3	2020	\$ -	\$ 206,325	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 37,249	\$ 123,104	\$ 160,352	\$ 176,073	\$ 66,516	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
4	2021	\$ -	\$ 144,585	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 99,920	\$ 122,172	\$ 222,092	\$ 180,475	\$ 62,114	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
5	2022	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 247,003	\$ 119,674	\$ 366,677	\$ 184,986	\$ 57,602	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
6	2023	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 253,178	\$ 113,499	\$ 366,677	\$ 189,611	\$ 52,977	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
7	2024	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 259,507	\$ 107,170	\$ 366,677	\$ 194,351	\$ 48,237	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
8	2025	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 265,995	\$ 100,682	\$ 366,677	\$ 199,210	\$ 43,378	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
9	2026	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 272,645	\$ 94,032	\$ 366,677	\$ 204,190	\$ 38,398	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
10	2027	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 279,461	\$ 87,216	\$ 366,677	\$ 209,295	\$ 33,293	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
11	2028	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 286,448	\$ 80,230	\$ 366,677	\$ 214,527	\$ 28,061	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
12	2029	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 293,609	\$ 73,068	\$ 366,677	\$ 219,991	\$ 22,698	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
13	2030	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 300,949	\$ 65,728	\$ 366,677	\$ 225,388	\$ 17,201	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
14	2031	\$ -	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 308,473	\$ 58,204	\$ 366,677	\$ 231,023	\$ 11,566	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 612,657
15	2032	\$ 5,185	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 316,185	\$ 50,493	\$ 366,677	\$ 231,613	\$ 5,790	\$ 237,403	\$ -	\$ 237,403	\$ -	\$ -	\$ 612,657
16	2033	\$ 242,589	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 324,089	\$ 42,588	\$ 366,677	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 612,657
17	2034	\$ 242,589	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 332,191	\$ 34,486	\$ 366,677	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 612,657
18	2035	\$ 242,589	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 340,496	\$ 26,181	\$ 366,677	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 612,657
19	2036	\$ 242,589	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 349,009	\$ 17,669	\$ 366,677	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 612,657
20	2037	\$ 242,589	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 357,734	\$ 8,943	\$ 366,677	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 612,657
21	2038	\$ 242,589	\$ -	\$ -	\$ 3,391	\$ -	\$ -	\$ -	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 245,980

LTFM Revenue Summary



\$700,000

\$600,000

\$500,000

\$400,000

\$300,000

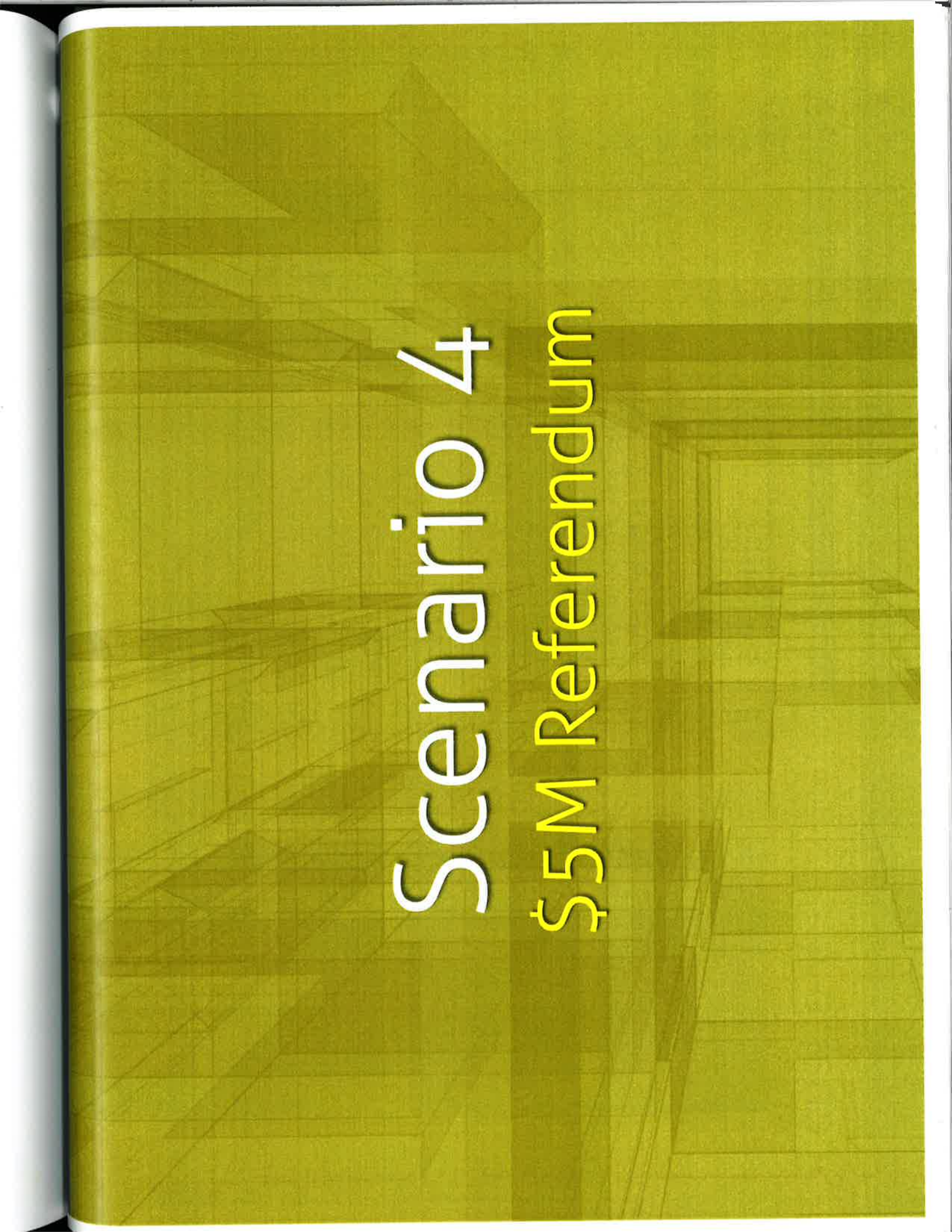
\$200,000

\$100,000

\$-



- Pay As You Go LTFM Levy
- Bonded LTFM Levy
- New Tax Abatement Levy
- Lease Levy
- New H&S Bond Levy
- Tax Abatement Levy
- New G.O. Bond Levy
- Debt Service Levy



Scenario 4

\$5M Referendum

Scenario 4

Leverage Utility and Operational Cost Savings

Bonded LTFM Revenue (\$3 million) for Deferred Maintenance

- 15 year earmark of 81% of the LTFM revenue authority

Use of Health and Safety Levy Authority (\$5 million) for IAQ Improvements

Ask Voters to Support a Referendum or use Lease Levy Authority to Improve Programming

Financial Summary

Total Value of Facility Reinvestment:

Grants/Rebates:

Capital Buy-Down

\$ 14,100,000

\$ -

\$ -

Net Investment Financed

\$ 14,100,000

Total LTFM Debt Equalization from State of MN:

\$ -

Annual Contribution from General Fund:

\$ -

Annual Tax Impact on \$80K Home:

\$ 27.17

Annual Tax Impact on 320 acres Ag. Homestead:

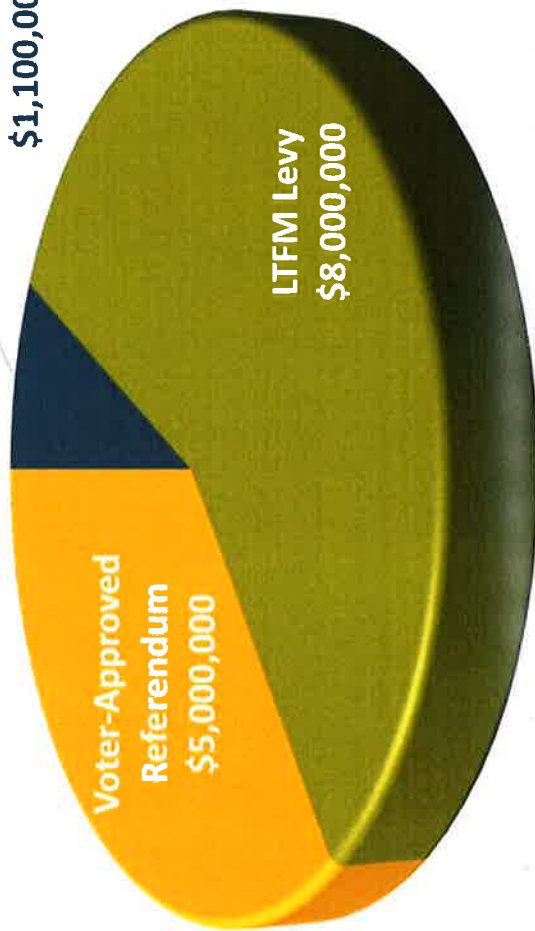
\$ 385

Annual Tax Impact on Ag., Non-Homestead Acre valued at \$6500 (\$/acre):

\$ 2.12

Sources of Funding

Operational Cost Savings
\$1,100,000



CAPITAL INVESTMENT

Grants

Capital Buy-Down

\$

\$

\$

14,100,000

-

-

3rd Party Financing	3.00%	15	\$	3,300,000
Facility Maintenance Bonds	2.50%	15	\$	3,000,000
Facility Maintenance Bonds (IAQ)	2.50%	15	\$	5,000,000
G.O. Building Bonds	2.75%	20	\$	5,000,000
Abatement Bonds	3.50%	15	\$	-

CAPITAL INVESTMENT	\$	14,100,000
Grants	\$	-
Capital Buy-Down	\$	-
NET INVESTMENT FINANCED	\$	14,100,000

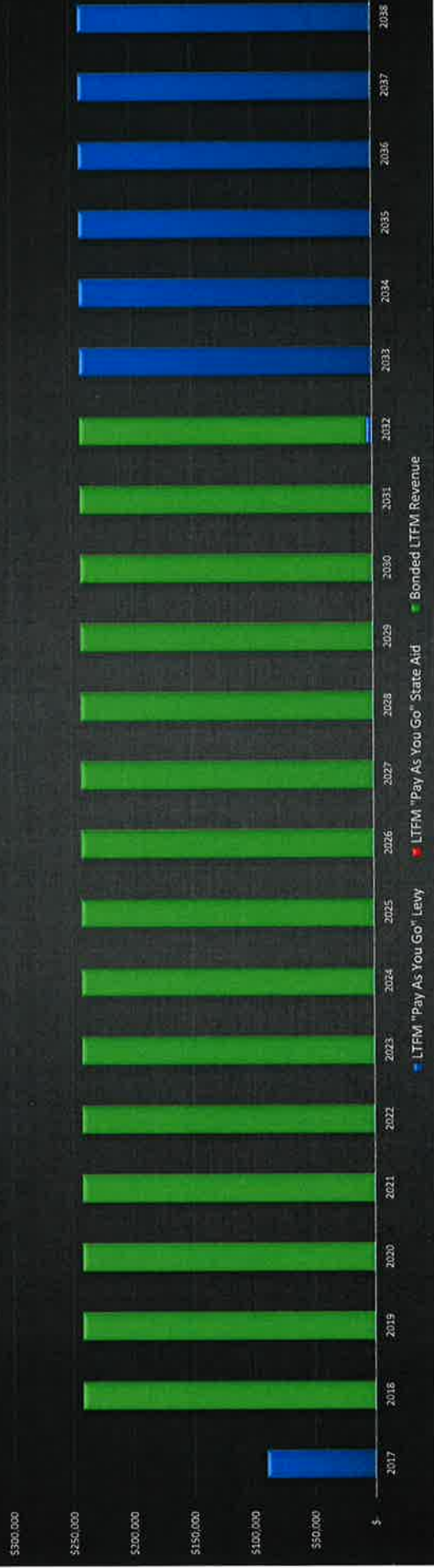
YEARS		PROJECT FUNDING							EXPENSES					CASH FLOW ANALYSIS		
	Utility Savings	Operational Savings	Escrow Interest Earnings	Rebates	Capital Contribution	(Referendum) Debt Service Levy	Tax Abatement Levy	3rd Party Financing	Facility Maintenance Bonds	G.O. Building Bonds	Abatement Bonds	Certificates of Participation	Technical Resource Services	Annual Cash Flow	Cumulative Cash Flow	
Year 0	\$ 19,314	\$ 15,000	\$ 70,500	\$ 5,800	\$ -	\$ -	\$ -	\$ (33,000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 77,614	\$ 77,614	
Year 1	\$ 58,000	\$ 15,563	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (605,623)	\$ (141,625)	\$ -	\$ -	\$ (7,200)	\$ (23,097)	\$ 54,517	
Year 2	\$ 60,175	\$ 16,146	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (604,153)	\$ (141,625)	\$ -	\$ -	\$ (7,470)	\$ (20,608)	\$ 33,909	
Year 3	\$ 62,432	\$ 16,752	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (602,788)	\$ (141,625)	\$ -	\$ -	\$ (7,750)	\$ (18,026)	\$ 15,882	
Year 4	\$ 64,773	\$ 17,380	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (664,528)	\$ (141,625)	\$ -	\$ -	\$ -	\$ (7,307)	\$ 8,575	
Year 5	\$ 67,202	\$ 18,031	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ (4,226)	\$ 4,349	
Year 6	\$ 69,722	\$ 18,708	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ (1,030)	\$ 3,319	
Year 7	\$ 72,336	\$ 19,409	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ 2,286	\$ 5,605	
Year 8	\$ 75,049	\$ 20,137	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ 5,727	\$ 11,332	
Year 9	\$ 77,863	\$ 20,892	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ 9,296	\$ 20,628	
Year 10	\$ 80,783	\$ 21,676	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ 12,999	\$ 33,627	
Year 11	\$ 83,813	\$ 22,488	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ (89,459)	\$ (809,113)	\$ (141,625)	\$ -	\$ -	\$ -	\$ 16,842	\$ 50,469	
Year 12	\$ 86,956	\$ 23,332	\$ -	\$ -	\$ -	\$ 269,501	\$ -	\$ (89,459)	\$ (681,237)	\$ (269,501)	\$ -	\$ -	\$ -	\$ 20,828	\$ 71,297	
Year 13	\$ 90,216	\$ 24,207	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ (89,459)	\$ (242,589)	\$ (708,149)	\$ -	\$ -	\$ -	\$ 24,964	\$ 96,260	
Year 14	\$ 93,599	\$ 25,115	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ (89,459)	\$ (242,589)	\$ (708,149)	\$ -	\$ -	\$ -	\$ 29,255	\$ 125,515	
Year 15	\$ 97,109	\$ 26,056	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ (89,459)	\$ (237,403)	\$ (708,149)	\$ -	\$ -	\$ -	\$ 33,706	\$ 159,221	
Year 16	\$ 100,751	\$ 27,033	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 127,784	\$ 287,006	
Year 17	\$ 104,529	\$ 28,047	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ -	\$ -	\$ (708,149)	\$ -	\$ -	\$ -	\$ 132,576	\$ 419,582	
Year 18	\$ 108,449	\$ 29,099	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ -	\$ -	\$ (708,149)	\$ -	\$ -	\$ -	\$ 137,548	\$ 557,130	
Year 19	\$ 112,516	\$ 30,190	\$ -	\$ -	\$ -	\$ 708,149	\$ -	\$ -	\$ -	\$ (708,149)	\$ -	\$ -	\$ -	\$ 142,706	\$ 699,836	
Year 20	\$ 116,735	\$ 31,322	\$ -	\$ -	\$ -	\$ 706,025	\$ -	\$ -	\$ -	\$ (706,025)	\$ -	\$ -	\$ -	\$ 148,058	\$ 847,894	
TOTALS	\$ 1,702,322	\$ 466,583	\$ 70,500	\$ 5,800	\$ -	\$ 7,490,446	\$ -	\$ (1,374,892)	\$ (9,544,699)	\$ (7,490,446)	\$ -	\$ -	\$ (22,420)	\$ 847,894	\$ 847,894	

West Central Area School District

Scenario 4 Levy Impact Summary

Period	Existing Levies				New Referendum Projects				New Health and Safety Projects				New Bonded Deferred Maintenance Projects				Other New Levies			Total Combined Levy
	Tax Pay Year	Pay As You Go LTFM Levy	Debt Service Levy	Abatement Levy	Tax Levy	New G.O. Bond Principal	New G.O. Bond Interest	New G.O. Bond Levy	H&S Bond Principal	H&S Bond Interest	New H&S Bond Levy	LTFM Bond Principal	LTFM Bond Interest	New LTFM Bond P&I	MN Debt Equalization Aid	Bonded LTFM Levy	New Tax Abatement Levy	New Lease Levy	Combined Levy	Increase
0	2017	\$ 90,389	\$ 207,270	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 301,050	\$ 653,079
1	2018	\$ -	\$ 203,490	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 238,034	\$ 125,000	\$ 363,034	\$ 167,589	\$ 75,000	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
2	2019	\$ -	\$ 204,960	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 242,515	\$ 119,049	\$ 361,564	\$ 171,778	\$ 70,810	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
3	2020	\$ -	\$ 206,325	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 247,213	\$ 112,986	\$ 360,199	\$ 176,073	\$ 66,516	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
4	2021	\$ -	\$ 144,585	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 315,133	\$ 106,806	\$ 421,939	\$ 180,475	\$ 62,114	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
5	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 467,597	\$ 98,928	\$ 566,524	\$ 184,986	\$ 57,602	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
6	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 479,287	\$ 87,238	\$ 566,524	\$ 189,611	\$ 52,977	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
7	2024	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 491,269	\$ 75,256	\$ 566,524	\$ 194,351	\$ 48,237	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
8	2025	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 503,551	\$ 62,974	\$ 566,524	\$ 199,210	\$ 43,378	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
9	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 516,139	\$ 50,385	\$ 566,524	\$ 204,190	\$ 38,998	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
10	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 529,043	\$ 37,482	\$ 566,524	\$ 209,295	\$ 33,293	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
11	2028	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 542,269	\$ 24,255	\$ 566,524	\$ 214,527	\$ 28,061	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
12	2029	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ 569,501	\$ 10,699	\$ 438,649	\$ 219,891	\$ 22,698	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
13	2030	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ 225,388	\$ 17,701	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
14	2031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ 231,023	\$ 11,566	\$ 242,589	\$ -	\$ 242,589	\$ -	\$ -	\$ 954,129	\$ -
15	2032	\$ 5,185	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ 231,613	\$ 5,790	\$ 237,403	\$ -	\$ -	\$ -	\$ -	\$ 954,129	\$ -
16	2033	\$ 242,589	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 954,129	\$ -
17	2034	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 954,129	\$ -
18	2035	\$ 242,589	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 954,129	\$ -
19	2036	\$ 242,589	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 954,129	\$ -
20	2037	\$ 242,589	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 141,625	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 954,129	\$ -
21	2038	\$ 242,589	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 952,004	\$ (2,125)
																			\$ 245,980	\$ (706,025)

LTFM Revenue Summary



\$1,200,000

\$1,200,000

\$1,000,000

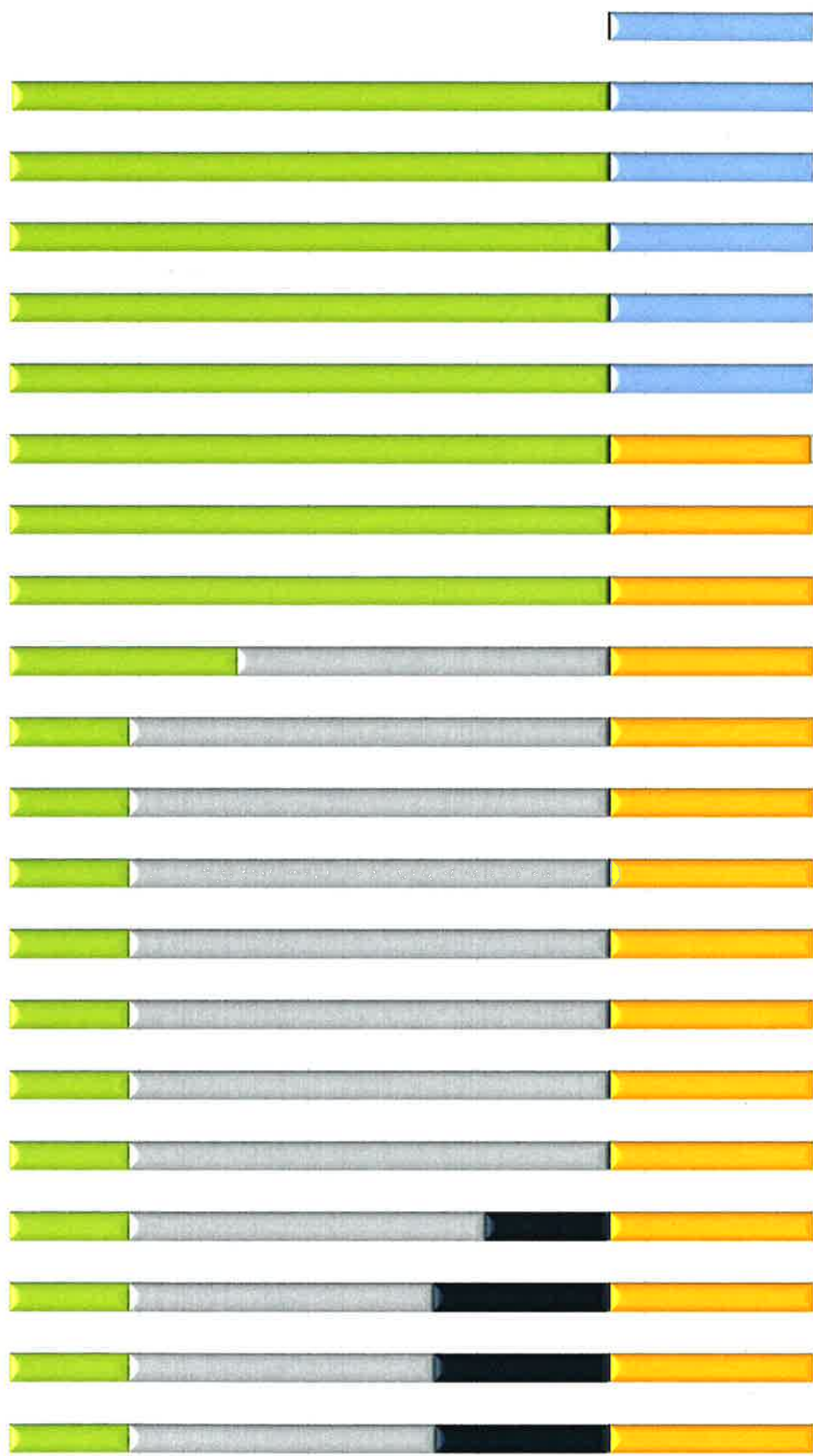
\$800,000

\$600,000

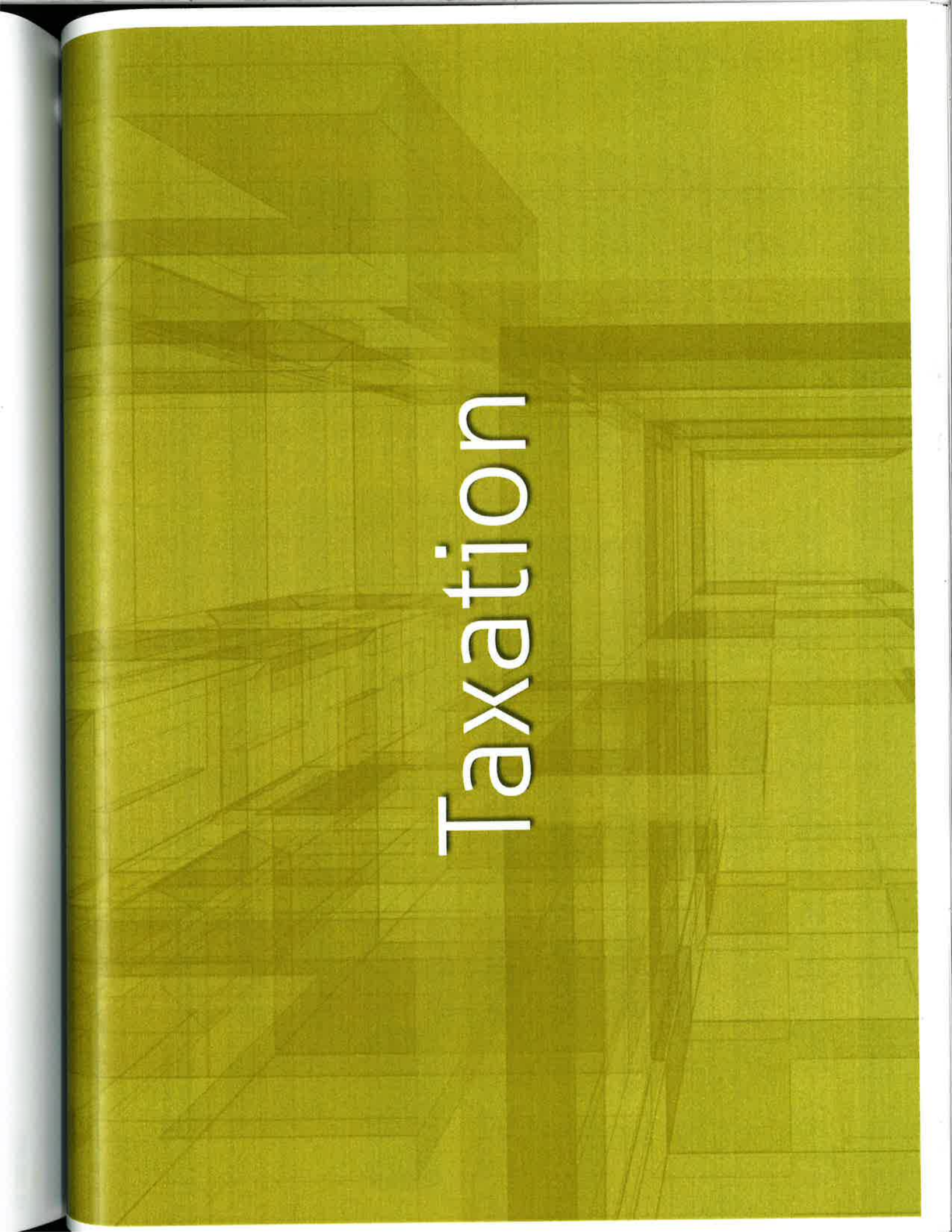
\$400,000

\$200,000

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- Pay As You Go LTFM Levy
- Bonded LTFM Levy
- New Lease Levy
- New Tax Abatement Levy
- Lease Levy
- New H&S Bond Levy
- Tax Abatement Levy
- New G.O. Bond Levy
- Debt Service Levy



Taxation

Tax Impact (w/Ag Credit)

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Levy Amount	\$0	\$0	\$311,607	\$653,079
Est. Tax Capacity Rate	0.0000%	0.0000%	2.5949%	5.4384%

The figures shown represent the preliminary estimated tax impact of a levy assessed on Net Tax Capacity. It is very preliminary as the 2016 NTC as reported on MDE's Pay 2018 tax levy certification is the basis for calculating the tax rate. This figure does not include other categories of the school district's property tax levy (including other debt service taxes), nor does it include property taxes for cities, townships, counties, or other taxing jurisdictions.

Average District Home Value

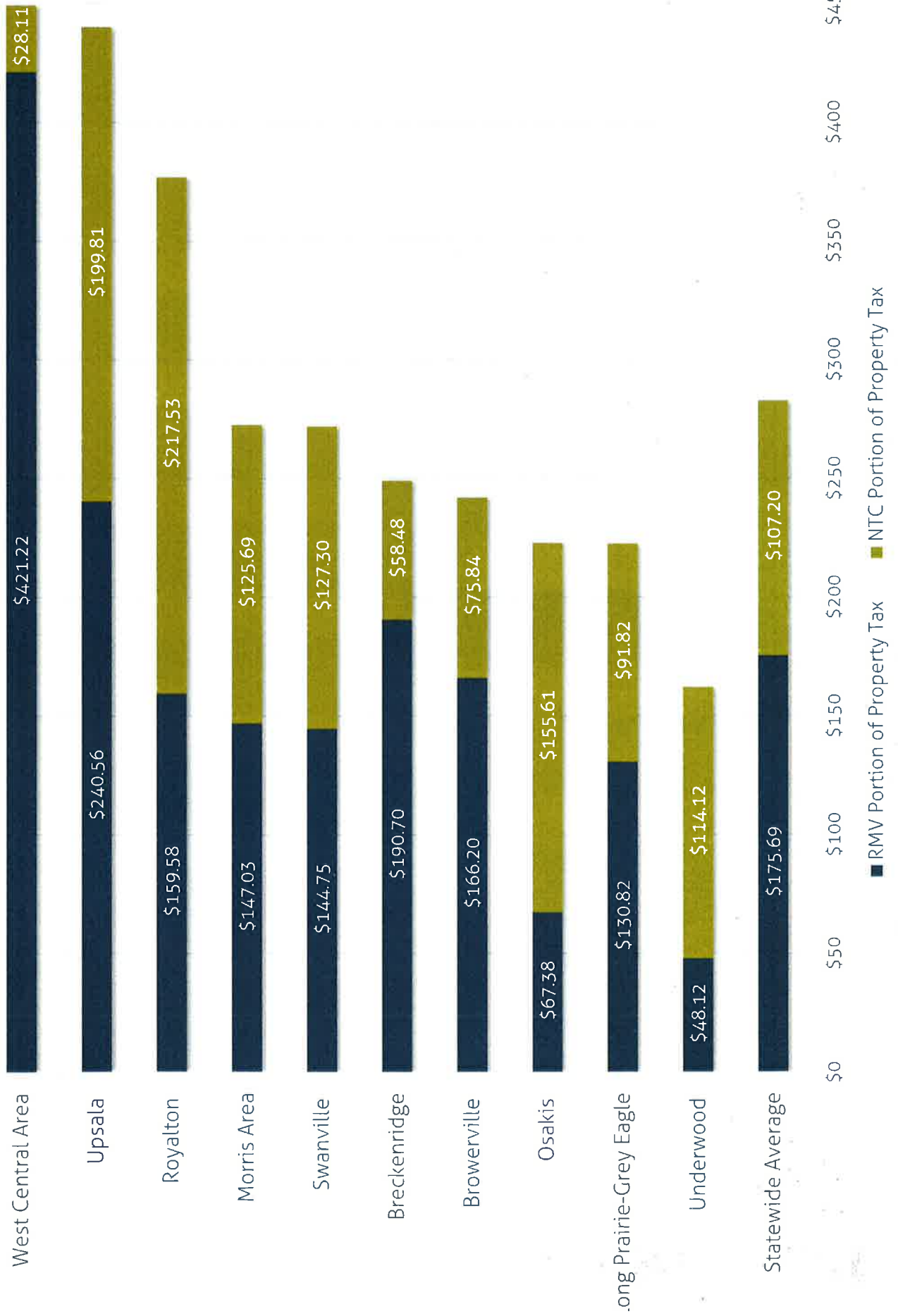
Type of Property	Estimated Market Value	Estimated Annual Tax Impact			
Residential Homestead	\$50,000	\$0.00	\$0.00	\$7.78	\$16.32
	\$60,000	\$0.00	\$0.00	\$9.34	\$19.58
	\$70,000	\$0.00	\$0.00	\$10.90	\$22.84
	\$80,000	\$0.00	\$0.00	\$12.96	\$27.17
	\$90,000	\$0.00	\$0.00	\$15.79	\$33.10
	\$100,000	\$0.00	\$0.00	\$18.62	\$39.03
	\$125,000	\$0.00	\$0.00	\$25.69	\$53.85
	\$150,000	\$0.00	\$0.00	\$32.76	\$68.67
	\$175,000	\$0.00	\$0.00	\$39.83	\$83.48
	\$200,000	\$0.00	\$0.00	\$46.90	\$98.30
	\$250,000	\$0.00	\$0.00	\$61.05	\$127.94
	\$300,000	\$0.00	\$0.00	\$75.19	\$157.58
Commercial / Industrial	\$80,000	\$0.00	\$0.00	\$12.96	\$27.17
	\$100,000	\$0.00	\$0.00	\$38.92	\$81.58
	\$250,000	\$0.00	\$0.00	\$110.28	\$231.13
	\$500,000	\$0.00	\$0.00	\$240.02	\$503.05
	\$750,000	\$0.00	\$0.00	\$369.77	\$774.97
Agricultural Non-Homestead (dollars per acre)	\$1,000,000	\$0.00	\$0.00	\$499.51	\$1,046.89
	\$5,000	\$0.00	\$0.00	\$0.78	\$1.63
	\$6,500	\$0.00	\$0.00	\$1.01	\$2.12
	\$8,500	\$0.00	\$0.00	\$1.32	\$2.77
	\$10,000	\$0.00	\$0.00	\$1.56	\$3.26
	\$12,000	\$0.00	\$0.00	\$1.87	\$3.92

Unesco is not acting as a municipal advisor or fiduciary on your behalf. Any municipal securities or financial products information provided is for general informational and educational purposes only and you should obtain the advice of a licensed and qualified financial advisor regarding such information.

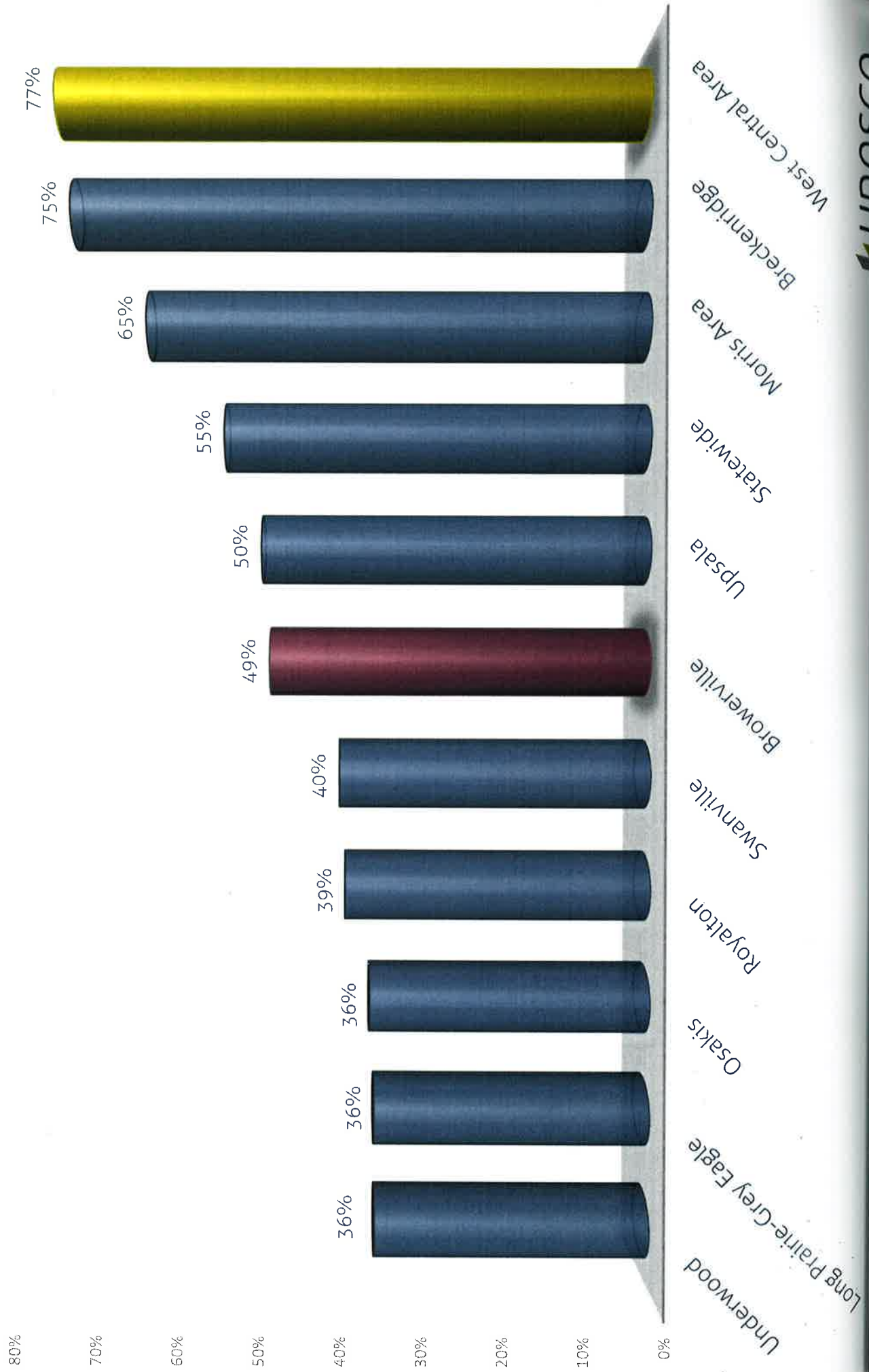
Unesco makes no representation or warranty regarding any financial projections, data or information provided, except as may be expressly set forth in a definitive agreement.

School Portion of Property Taxes Payable in 2017 on a \$80,000 Homestead Residential Property

School Portion of Property Taxes Payable in 2017 on a \$80,000 Homestead Residential Property



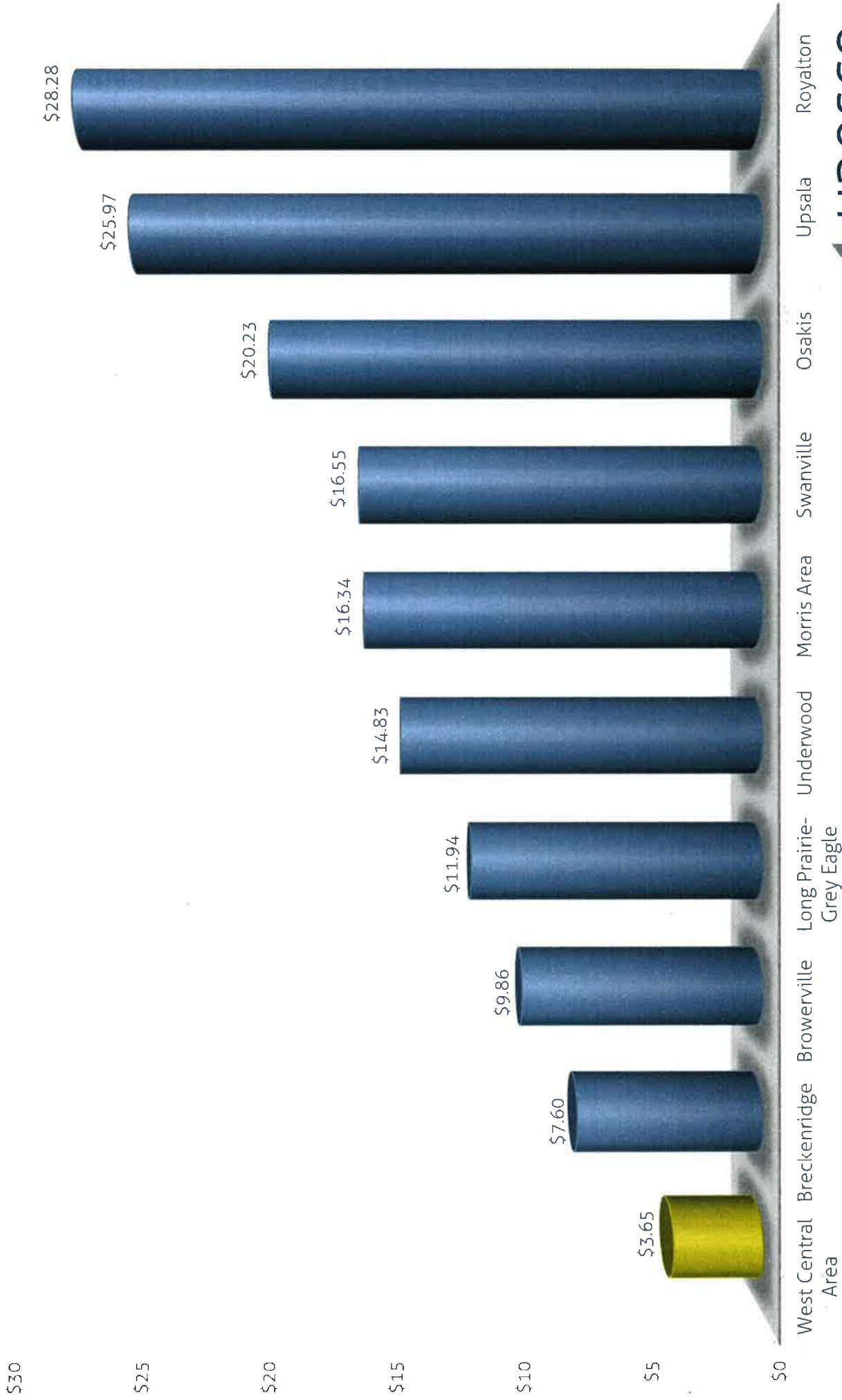
% Agriculture of Net Tax Capacity



School Portion of Property Taxes Payable in 2017 on a 1-acre Non-

homestead Agricultural Property valued at \$6,500

School Portion of Property Taxes Payable in 2017 on a 1-acre Non-homestead Agricultural Property valued at \$6,500





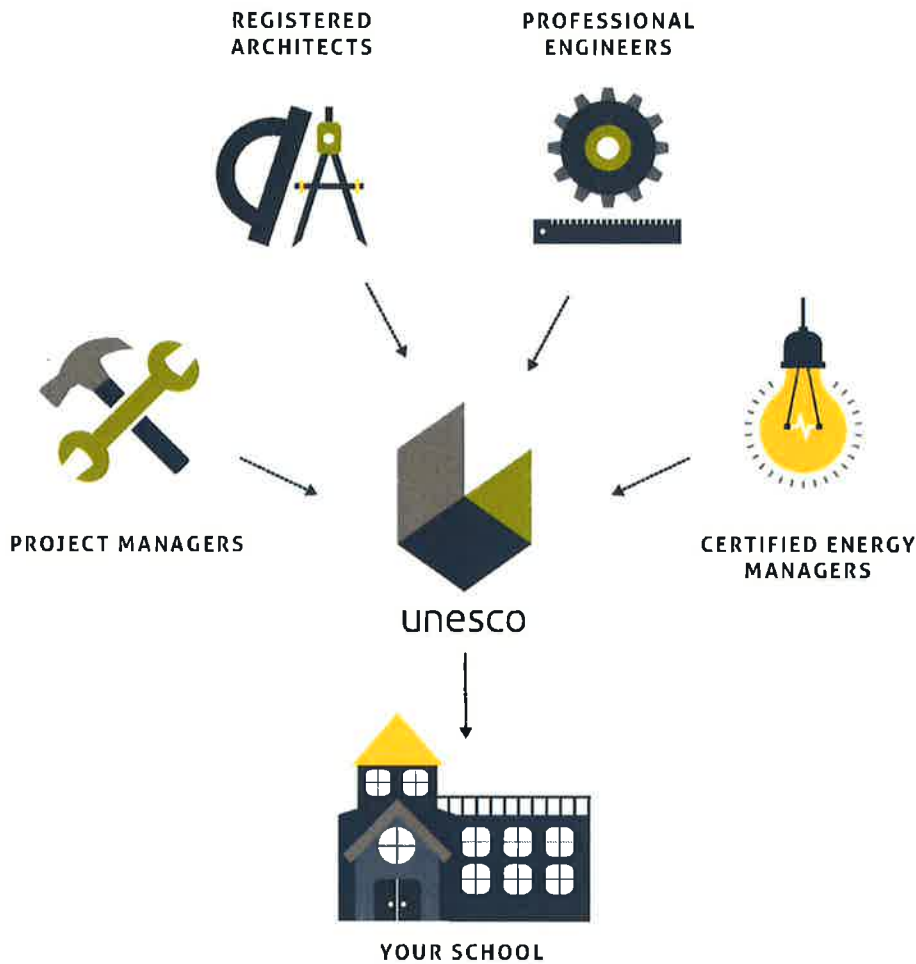
UNESCO QUALIFICATIONS AND CAPABILITIES

How We Can Serve You



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

Program Management Firm



Unesco represents a single source of responsibility/accountability. No longer would you experience the “finger pointing” associated with the traditional construction process.

Unesco is a ‘Program Management Firm’ that assists school districts with the revitalization, renovation and new construction of educational facilities. With an experienced team of in-house architects, designers, engineers, and project managers, Unesco is able to provide a more efficient and cost-effective solution for the long-term facility management needs of K-12 schools. Unesco’s experience and understanding of the engineering process eliminates high contingency costs and streamlines construction to ensure that projects stay on schedule and within budget.

Unesco provides public school districts with comprehensive Master Facility Planning services. We have supported 90 K-12 districts with Master Planning services. Over the past 18 years, our team has helped districts overcome challenges similar to those of West Central Area schools, as described in this document. While our team has been providing these services since 1997, the great majority of our staff members average more than 30 years’ experience in helping districts align their facilities with their strategic objectives.

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In working with numerous school districts on similar projects where we've been the school district owner's representative and Program Manager, we have seen that architectural services often make up only a small fraction of the overall services required to develop and implement a full-realized Master Facility Plan. Unesco is uniquely positioned to supply the resources required for the successful development, financing and funding, implementation and commissioning of a Master Facility Plan. Below is a comprehensive list of Master Facility Planning services Unesco customarily delivers while assisting school districts with their long-range Master Facility Planning and implementation needs.

We offer a variety of professional services including the following:

- **Building Systems Assessment.** Perform a thorough analysis of your current control system's capabilities, efficiency, and safety concerns.
- **Facility Improvement Options.** Recommend renovation and revitalization opportunities for the existing facilities.
- **Financial Analysis.** Provide assistance in securing state, federal and third party funding to support financial stability.
- **Preliminary Planning.** Discuss among project stakeholders regarding scope, schedule, budget, areas of responsibility, and approvals process.
- **Master Planning.** Create a formal document intended to guide the long-term strategic development of your district's educational facilities.
- **Comprehensive Facility Asset Assessment.** Estimate value of existing facilities based on their current state and revitalization needs.
- **Operational Cost Analysis.** Analyze expected costs related to the various revitalization efforts including: planning, design, engineering and construction.
- **Education Adequacy Assessment.** Analyze the school district facilities' ability to accomplish your educational goals, based on their capacity, quality, layout and aesthetics.
- **Gross Square Foot and Individual Room Capacity Analysis.** Analyze the facilities' capacity to help determine if it can support the surrounding community's needs.
- **Referendum Support.** We have the local outreach and marketing expertise to support a public referendum initiative.
- **Alternative Funding Opportunities.** Evaluate alternative funding strategies to develop budget-neutral facility improvements that do not require a referendum.
- **Enrollment Projections.** Supply a historical review of enrollment trends and a ten-year look ahead to forthcoming enrollment trends.

Why is it better for schools to work with a Program Management Firm?

A Program Management Firm, like Unesco, helps to ease the administrative burden that school districts encounter by working with independent professional services providers such as architects, engineers, designers, and builders. When working with independent providers, districts will be required to manage multiple relationships, keep track of the various timelines and schedules, and act as an intermediary between parties that are only responsible for a small portion of a much larger project. Unesco's comprehensive approach stands in direct contrast to this silted approach by providing school districts with a single point of contact who will provide them with up to date information about the project, answer any questions they might have, and provide the peace of mind that can only be found by working with an experienced Project Management Firm.

Beyond the streamlined communication and project management process, Unesco is committed to ensuring the long-term success of your facility project. When Unesco assists your district in the development of a Master Plan, it is a statement that we will continue to work by your side until the project is complete. Independent providers are only required to honor their work until the warranties expire (typically 1--3 years).

Another concern when working with independent professional services providers is the concept of "over-engineering." This is the term used to describe the extra time, costlier products, and unnecessary work that independent architects and engineers will incorporate into their designs to protect themselves if something goes wrong and the finger--pointing begins. This approach to design and building puts the interests of the contractors in front of the needs of the district. Unesco is able to eliminate over-engineering by employing an in-house team of architects, engineers, designers, and builders. Our experts work together long before the project moves into the construction phase to ensure that each project stays within budget and is delivered on time.

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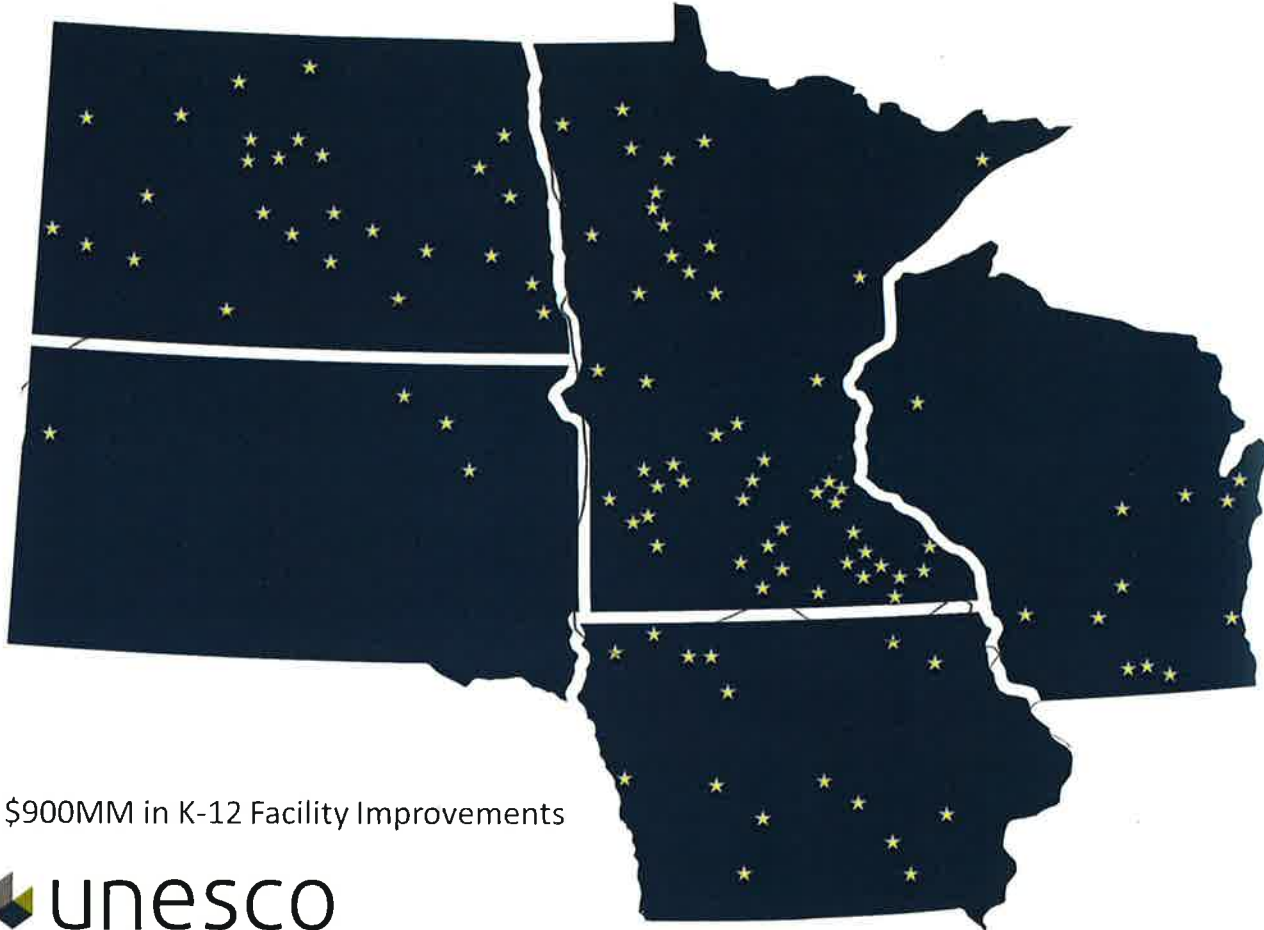
As West Central Area Schools' owner's representative and professional services provider, Unesco would be 100% accountable for all aspects of the project. Throughout the process, we maintain that single source accountability. Should a question, comment, or concern arise, there is one number to call: Ours. We're both 'one throat to choke' or better yet, 'one back to pat.'



Experience with Public Facilities

Because of our continual drive to be the best, we have a sterling record of accomplishment of success. Our clients know that Unesco's goal is always to protect their best interest.

At Unesco, we have identified the core competencies needed and are staffed with the expertise required to develop and implement comprehensive cost management/facility improvement programs as well as provide any requested on-going services to ensure your program's long-term success. Unesco's team consists of experienced industry professionals who have over 1,000 years of experience designing, and implementing Master Facility Plans. Our team collectively has engineered and **implemented well over \$900 million of facility improvements in K-12 districts.**



\$900MM in K-12 Facility Improvements

The following is a partial list of references and contact information. Please note this is a brief list of K-12 references. Additional references are available upon request.

Abbreviated List Unesco K-12 References		
Reference	Contact(s)	Phone Number
Hopkins Public Schools Hopkins, MN <i>Project: \$125 Million</i>	Mr. Patrick Poquette <i>Supervisor of Buildings and Grounds</i>	(952) 988-4264
	Mr. John Toop <i>Director of Business Services</i>	(952) 988-4004
Alden-Conger Schools Alden, MN <i>Project: \$12.4 Million</i>	Mr. Brian Shanks <i>Superintendent</i>	(507) 874-3240
	Ms. Janet Bremseth <i>Director of Business Services</i>	(507) 874-3240
Cannon Falls Area Schools Cannon Falls, MN <i>Project: \$11.4 Million</i>	Ms. Beth Giese <i>Superintendent</i>	(507) 263-6800
Houston Public Schools Houston, MN <i>Project: \$6.7 Million</i>	Ms. Krin Abraham <i>Superintendent</i>	(507) 896-5323
	Ms. Gwen Rostad <i>Director of Business Services</i>	(507) 896-5323
Robbinsdale Area School District Robbinsdale, MN <i>Project: \$10.1 Million</i>	Mr. Dale Sundtrom <i>Director of Business Services</i>	(651) 582-8605
Kaukauna Area School District Kaukauna, WI <i>Project: \$48.8 Million</i>	Mr. Mark Duerwaechter <i>Superintendent</i>	(920) 766-6100
	Mr. Robert Schafer <i>Director of Business Services</i>	(920) 766-6100
School District of Janesville Janesville, WI <i>Project: \$1.6 Million</i>	Mr. Keith Pennington <i>Director of Business Services</i>	(608) 743-5015
	Mr. Dave Leeder <i>Director of Buildings and Grounds</i>	(608) 743-5083

Our selection of the Unesco team was based on their reputation and experience with educational facilities. Unesco wasn't afraid to have us check all of their references.

Lance Bagstad, Superintendent (218-329-8362)
Renville County West Schools (now at Park Rapids)

Personnel Information

Unesco has assembled the region's finest group of professionals dedicated to assisting public entities maximize their existing facilities.

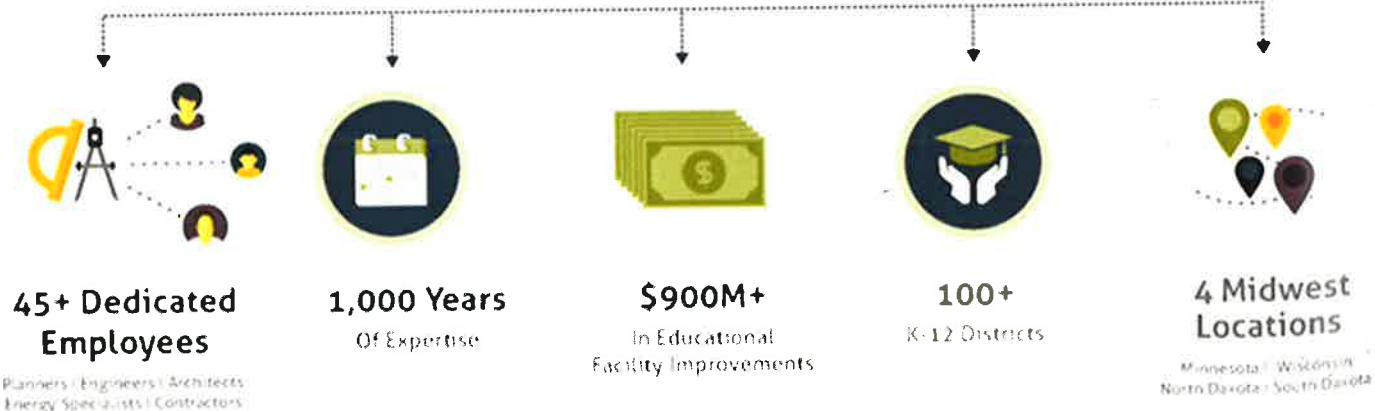
Unesco has a sizable staff of professionals, with experience and expertise in all aspects of facility improvement projects. We can provide a comprehensive and turnkey approach to facility management. By selecting Unesco, you will be selecting the industry's most comprehensive and objective engineering and implementation team, ready to develop practical solutions for West Central Area Schools.

Capable In-House Team



UNESCO BY THE NUMBERS

The Unesco team has been hand picked for their skills, knowledge and expertise in all aspects of energy services and facilities management.



Other Considerations / Firm Differentiation

YOU...and only YOU...Have Control

Throughout planning, implementation, and on-going support, this would be West Central Area Schools' project, not Unesco's. You bring us objectives and challenges, and we bring you ideas and options.

Ultimately, **this is your project**; you choose the appropriate balance between facility improvements and financial investment. Further, we work with you to identify and select a team of personnel and contractors with which the district has had success in the past. As we have described, you will remain involved as we plan, schedule, and implement the project; essentially, we manage the project in accordance with your expectations, within the operating parameters you set forth. We establish lines of communication, enabling you to remain abreast of progress and issues. Of course, we work with you to close-out the construction phase. Finally, we offer training and support (of your design and choosing) to ensure the sustainability of the improvements we implemented.

Our past customers, all of which we would make available to you, stand in testimony to their control and involvement in their projects.

Unesco's Ability to Implement the Project That Results from Planning

Coordinating and managing a team for the successful implementation of a long-range facility plan requires a thorough process, such as the one developed and used by Unesco. As your staff knows all too well, the district's activities do not close down because a new building is being constructed, a remodeling project is underway, or systems or equipment fails. Operations are expected to continue immediately and without disruption. Unesco's project manager will work closely with district staff to carefully design and plan all installation activities to accommodate the busiest of environments without disruption.

Owner Involvement

Unesco has always promoted an interactive working relationship with our clients. Our proposition is to work with West Central Area Schools' stakeholders to develop a team of personnel and contractors that the district has had success working with in the past.

We will also work closely with West Central Area Schools' staff to select local contractors with whom you have had success during past projects. In addition, if desired by the district, we will seek competitive quotes from multiple local contractors. This will ensure that competitive pricing is received, yet those with whom you have had positive experiences will get preference.



Our design professionals are recognized leaders in the planning and design of educational facilities. More importantly, our team is comprised of firms and individuals that are passionate about working together to identify all project opportunities, and to develop thoughtful and comprehensive designs that will stand the test of time, will gracefully adapt to future changes in science and teaching methodologies.

Schedule and Coordination

Unesco will coordinate work around class times, office hours, peak facility usage, activities, events, and ongoing processes such as food preparation. Furthermore, Unesco realizes that it is quite common for the district to have multiple projects progressing at the same time (i.e. roof replacement project); we will work and communicate with the other project managers to avoid conflicts and redundancies, and when possible, we will overlap disruptions to minimize inconvenience.

Schedule and Coordination

Unesco will coordinate construction work around class times, office hours, peak facility usage, activities, events, and ongoing processes such as food preparation, sporting events, or musical concerts to name a few. Furthermore, Unesco realizes that it is quite common for a facility to have multiple projects progressing at the same time; we will work and communicate with the other project managers to avoid conflicts and redundancies, and when possible, we will overlap disruptions to minimize inconvenience.

During the comprehensive facility assessment phase, Unesco will deliver several reports, each with progressively more information. As the scope takes shape, the implementation team will be there to ensure flawless execution during implementation by advising on cost estimating, constructability or coordination considerations, and to ensure that as the project evolves from ideas, to development of energy conservation measures (ECMs), through scope selection, and into implementation, there is a seamless handoff among our staff. In example: If systems will be modified, it is critical to have the design and installation allow for commissioning as the ECM intended to meet the savings guarantee either from energy or operational optimization.

Project Management Process

Unesco's fourfold project management process includes: 1) the careful and complete definition of the project scope including the operating parameters and expectations; 2) identify and qualify the best possible execution team; 3) develop a detailed execution plan; and 4) establish the communication protocol to use on the project. Each of these aspects will be discussed in detail in the following pages. The project is managed and the implementation team is coordinated with a detailed project management process; the team is enabled and state of the art project management tools and software control the process.

Project Scope Definition

Unesco's Project Managers play an active part in the project from its conception, through planning and design phases; after the project is approved, they take control through the implementation and warranty period. Unesco's project managers are **field-tested professionals** with construction management, engineering, and business backgrounds that get involved with the design team during the definition and design phase of the project. As improvement opportunities are identified and quantified by the engineering team, the project manager evaluates the practicality of the installation, the parameters for the implementation, the risks involved, and the economics as they relate to the overall project goals of the customer.

The first step in the project management process is a complete and thorough definition of the project scope. A project kick-off meeting between West Central Area Schools stakeholders and the Unesco Project Manager will seek to define installation standards and procedures that will be included as part of the scope of work for each energy conservation measure and each facility improvement measure. The bulk of the project scope is the design criteria from the engineering recommendations of the detailed audit. In addition to "what" needs to be installed, the scope definition includes identification of actual operating information on each facility improvement (air and water flow data, motor speed, entering and leaving temperatures, etc.). Finally, the project scope of work defines specific equipment, installation guidelines, references SDSU's Facility Design and Construction Standards and applicable building and installation codes.

Operating Parameters

The definition of the projects operating parameters is also part of the project kick-off meeting between SDSU's technical representatives and the Unesco project management team. These parameters include data that will allow the project manager to effectively plan the successful implementation of the improvements.

Expectations

Definition of the client's goals for this project will be discussed with SDSU technical representative(s), business representative(s), and with Unesco's project manager. The Unesco team expects to manage this project **on time**, **on budget**, and to your **satisfaction**. Therefore, it is critically important that we are aware upfront what the expectations are from the stakeholders as they relate to:

- | | |
|----------------------|--|
| ✓ Disruptions | ✓ Clean-Up |
| ✓ Scheduling | ✓ Safety |
| ✓ Existing Processes | ✓ Subcontractor/staff interaction requirements |

It is only through the careful and detailed definition of the project that the successful implementation of the project plan can commence. Unesco goes well beyond the traditional project boundaries to ensure that the beginning, middle, and end of the project meet the expectations and satisfaction of SDSU personnel, while meeting the operating and savings expectations of the engineering team.

Project Planning

During the planning phase of the project, Unesco's Project Manager will develop a detailed project plan. A detailed and dynamic project plan is imperative to the successful completion of a project. This project plan will include the engineering design criteria, equipment specific information such as lead-times, and the project definition criteria established during the pre-project meetings.

The preliminary plan will be developed on a facility improvement measure ECM-by-ECM basis. This plan will be modified as necessary to include information made available during the audit along with the facility operating schedules. The detailed installation plan will accommodate the operational schedule to the maximum extent possible.

Where disruptions in operations are inevitable, the project manager will document the expected interruption and its impact on the facilities, and communicate this interruption to the customer's representatives and facility operator. The plan and all expected disruptions will be required to be confirmed by the project manager before installation of the facility improvement measure begins. The plan will also show the critical project path so that at every point during the implementation, the project manager will know where the resources should be concentrated to finish on time.

The project plan will be updated monthly and will be posted in Unesco's on-site office. All installing parties involved with an ECM will be required to accept and adhere to the detailed installation plan. The plan will be made available to every subcontractor and supplier in both hard copy and electronic form, and plan adherence will be built into every subcontract issued. We will also make the project schedule available to each facility operator affected by the installation along with complete documentation of work involved, expected down time, and expected delays, prior to starting work.

Implementation Team Selection

The development of a team capable of executing the designed work per the established operating parameters and project plan is critical to a project's success and a customer's satisfaction. It is for this reason that Unesco goes beyond traditional professional services companies and follows a project tested subcontractor and supplier evaluation and selection process. The evaluation determines a subcontractor candidate's strengths and weaknesses, and development of a plan to manage the relationship. Constant evaluation of all subcontractors and suppliers throughout a project enables Unesco to monitor their performance and further assess their capabilities. Maintaining expertise of the entire Unesco team at a level necessary to meet the cost, schedule, and quality expectations of the customer is critical on every project.

Subcontractor and Supplier Identification



Our subcontractor identification process targets subcontracting candidates by their relationship with the customer, experience, expertise, and abilities. The defining parameters of the project (size, complexity, duration, geographic location, etc.) also help to identify the most effective implementation team. The most important aspect in managing and coordinating an implementation team is to make sure the best possible team members are in the appropriate positions.

Often customers have preferred contractors that have given them exceptional service over the years and they would like them to take part in the project; or, they have employees that are interested in working on the project in a subcontractor's capacity; or, they wish to do a portion of the required work in-house. Unesco welcomes the opportunity to work with preferred contractors, employees, and West Central Area Schools staff as a subcontractor. In the interest of the successful completion of

project and in the interest in maintaining quality and completing the project on time, Unesco will use the same evaluation process on the preferred contractors and employees. This process will help the Unesco Project Manager to identify areas of expertise among the candidates so their experience can be optimized; and it will help to identify areas of weakness that will allow the Unesco project manager to find assistance. The result of this careful selection process is a customized implementation team capable of delivering the best possible project to the West Central Area Schools.

Subcontractor and Supplier Qualifications and Evaluation

After being identified as a potential subcontractor, all subcontracting candidates must fill out a **Contractor Qualification Statement** and submit it to Unesco. This qualification process helps us to define and quantify subcontracting candidates' experience, ability, and stability. This process assists in identifying the strengths and weaknesses of our subcontractors and suppliers, allowing us to select the best possible candidate that can not only accomplish the project but also help us meet the goals of the community and the spirit of the request. The qualification process also allows us to develop our relationships and to focus our project management attention, allowing our interactions to be transparent to our clients.

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Subcontractor Management

After working with the West Central Area Schools to select the members of the implementation team, it is important to establish clear goals and objectives for the project with each subcontractor and supplier. Effective subcontractor and supplier management and communication are important to performing effectively on a project because of the critical roles assigned to each member of the team. We require that a single focal point be established at each subcontractor for cost, schedule, and technical performance, with the authority to make commitments and to follow through in their execution. We also require the subcontractor to identify an administrator responsible for contractual/administrative matters. To operate as a seamless team, we establish these links with each of our subcontractors to facilitate communication before and after contract award. Our proven subcontracting process allows us to provide a seamless, integrated, complete solution that meets all the goals of the project.

Project Communications

Information exchange is the single most important aspect of project management. It is therefore imperative to the success of the project and everyone involved that **clear written and verbal communications paths and protocol** be established. Getting the right information to and from the right parties is critical to the project schedule, the satisfaction of the customer, and the overall success of the project. Unesco takes pride in its approach to establishing the best project communications possible. Three aspects that distinguish the Unesco approach from traditional contracting firms are: the establishment of an on-site project office, regular mandatory project progress meetings, and a formal communications path and protocol.

On-Site Office

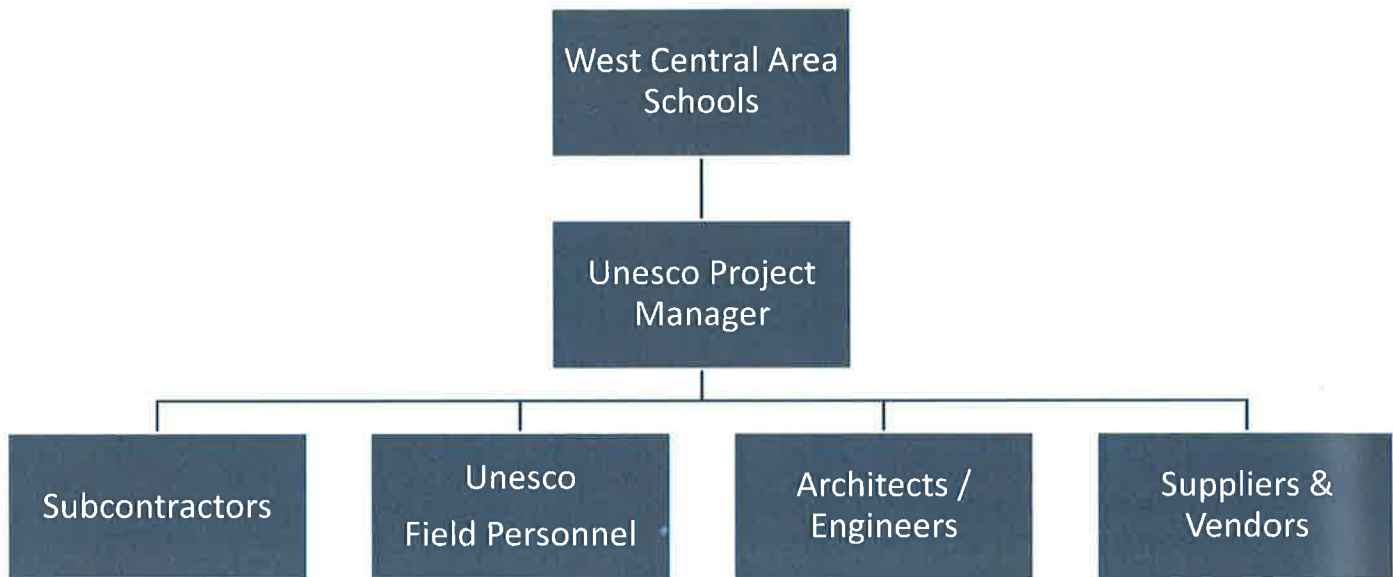
During the technical audit, Unesco will seek to establish an on-site project management office complete with phone, fax and computer access for Unesco use as well as the use of all subcontractors involved. If space is not available in the facilities, we will explore renting a mobile office and equipment and position it appropriately. This office allows the project manager to spend **more productive time on-site** and be available for questions and conflict and problem solving. It also functions as a verbal communications and information hub and makes on-site employees more efficient by giving them a place to take care of their non-installation business.

Regular Project Meetings

Mandatory project progress meetings will be held regularly throughout the project. The progress meetings are an important tool in identifying and solving problems and conflicts and they are imperative to keeping the project plan current. Meeting minutes will be drafted and circulated after each meeting to ensure that all parties are informed of project progress and issues. While regular mandatory project meetings have long been standard procedure on new construction projects, energy services providers tend to disregard their value. Unesco however, in seeking to take the **best practices** from the construction industry, holds mandatory project progress meetings.

Establishment of Communication Lines

While Unesco would never seek to restrict communications between any of the subcontractors or the facility's representatives, we do establish **formal lines of communication**. Such a formality assists everyone on the project in knowing his or her communication obligations. This will also minimize needless paperwork, and senseless information transfer. To illustrate our establishment of formal communication lines, we have developed a preliminary project communications outline (shown below).



Vendor Neutrality

Unesco is a sole proprietor having no link to a larger corporate entity ensuring we will be truly vendor neutral. This allows us to provide an unbiased perspective and to research the companies in your vicinity that will provide the best product and service requisite of your unique situation. We do not have any predetermined subcontractors we use on any renovation projects. We will work with your in-house personnel to acquire knowledge from the source to effectively select vendors that will work for you. We will consider identified contractors that you have worked with in the past with positive outcomes.

Commissioning

Cost effective "post" mechanical and electrical system installation support that provides our clients with the assurance that systems are performing per engineering design and manufacturer specifications. Aside from state guidelines now mandate commissioning on projects of this type, a growing list of satisfied customers will verify the benefit of proper commissioning. We have learned that properly designed and installed mechanical and electrical systems provide our customers maximum comfort, safety, energy efficiency, and extended equipment life.

Close Out

As improvements are completed, the installing contractors will notify the Unesco project manager who will develop a completion punch list. When the punch list is completed, the operation will be verified and a turnover and training session will be scheduled. At the turnover and training session, the installing contractor, the owner representative, and the Unesco project manager will validate and accept the installation. The installing contractor will then proceed with training the owners' representative on the operation of the installed equipment. Operations and maintenance manuals will be developed and given to the owners' representatives at this training.

The ultimate success of this project will be the result of a successful project management plan. In this regard, we understand the importance of delivering quality projects. We also understand the challenges presented by managing a project from a remote location. We have developed a project management approach that allows us to successfully implement our projects throughout the region. Our references will validate that Unesco has been able to effectively manage these projects with our unique project management approach and has ensured that the projects have been kept on schedule and on budget.

Unesco Commissioning

100%, Point-to-Point

Confirms proper and
efficient operation

Confirms proper
installation

Traditional Commissioning

Statistical Approach

Manage project
"punch lists"

Unesco's Ability to Blend Multiple Funding Sources

Even the best-crafted plans are of no value without proper funding to implement the course of action. Unesco has the financial expertise to help uncover and evaluate all the funding vehicles available to the public sector. Many of our solutions involve three to six methods of funding and result in a positive (or worst case, neutral) impact on your operating budget. We will work with the business office to ensure West Central Area Schools' solution is sound and meets all of the district's requirements.

Unesco will explore multiple funding sources that may be used for financing the West Central Area Schools' Master Facility Plan. Unesco's approach is to capitalize on the least expensive forms of project funding, i.e. utility company rebates, first, before utilizing more expensive forms of financing such as third party financing. The following sources will be analyzed and included in the detailed audit analyses:

Unesco Understands K-12 Financing

- Knowledge and comprehension of statutes and funding vehicles
- Working relationships with K-12 financial advisors

Cost Effective

- Not a profit center for Unesco
- Administrate most cost-effective financing methods
- Relationships with national and local financing resources

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Qualifications Conclusion

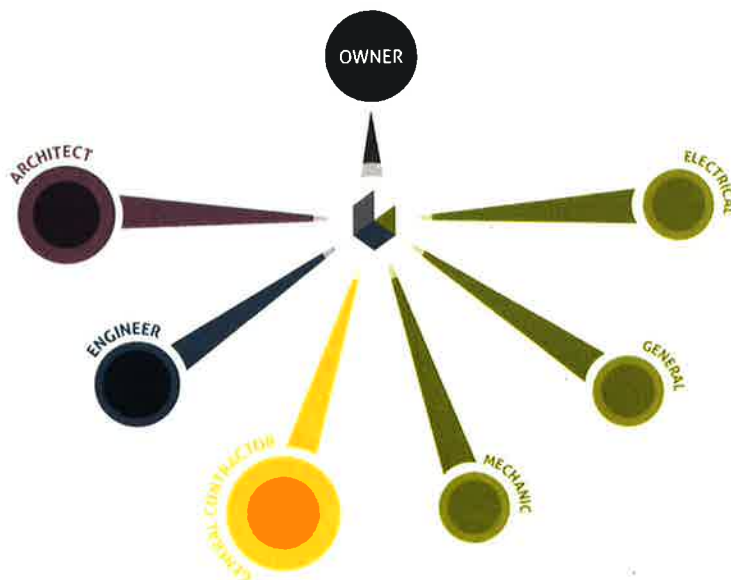
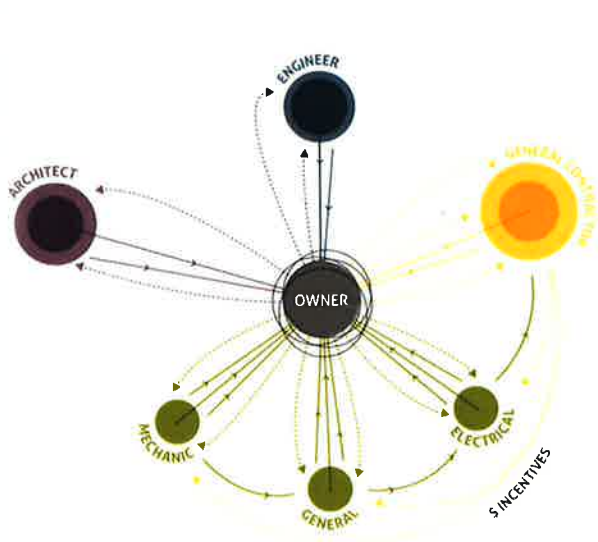
Selecting a qualified professional services company is an important decision for any school district since the firm that you choose will become a long-term partner of your district. As you evaluate potential partners, you will undoubtedly start to see similarities and after a while, you may unconsciously begin to think that all firms are the same. The majority of companies hope that your judgment becomes clouded so that your choice is based upon name recognition of their company, not their record of accomplishment. Unesco is confident that if you take a hard look at the choices, you will conclude that Unesco is the most qualified and offers the best assurance of long-term success for implementing a Master Facility Plan.

As a superintendent who has served in four districts, I have witnessed first-hand the improvements to our learning environments that result from a Unesco Master Facility Plan. The professional competence of Unesco combined with their focus on the needs of the school district set them apart from many other providers who are driven by company profits.

Brian Grenell, Superintendent
Madelia Schools

LETTING EDUCATORS BE EDUCATORS

Unesco eases the administrative burden by filtering out the noise of independent contractors.



MASTER PLANNING AGREEMENT



PLANNING ♦ ARCHITECTURE ♦ ENGINEERING ♦ CONSTRUCTION ♦ ENERGY

Master Planning Agreement (MPA)

West Central Area Schools
301 County Road #2
Barrett, MN 56311

Unesco, Inc.
2125 2nd Street
Saint Paul, MN 55110

Unesco agrees to undertake a detailed Master Facility Plan of West Central Area Schools' facilities:

Facility	Address	City	Sq Ft	Age
West Central Area Schools	301 County Road #2	Barrett	130,000	23
WCA North Elementary	411 First St SE	Elbow Lake	75,181	53
WCA South Elementary	31 N Central Ave	Kensington	35,704	53

District Totals/Averages (from MDE) **240,885** **36.8**

The Master Facility Plan is intended to furnish West Central Area Schools with study findings, conclusions, alternatives, and recommendations, which would assist the district's leadership in fashioning a comprehensive plan of action intended to achieve enrollment stability and growth, improve learning environments, and enhance effectiveness, efficiency, and cost/effectiveness of the district's operations.

This Master Facility Plan involves surveying and documenting current operational and physical conditions and deficiencies evident in the above-referenced buildings. The information documented in the Master Facility Plan will be gathered primarily through field observation and supplemented by evaluation of existing information and discussion with district personnel. The survey will review the appearance, condition, and current uses of the buildings. This data is used to determine the feasibility and cost of infrastructure replacement/enhancement, facility renovation/remodeling, reallocation, and/or expansion. The process includes a review of available existing floor plans and walk-through of all the buildings.

The Master Facility Plan explores conditions and deficiencies in sixteen important areas, which are outlined as follows:

A	Accessibility	This section addresses the conformance of the facility to the intentions of accessibility requirements with focus on the following issues: accessible parking, an accessible route to the main entrance, ability to attain all levels of the facility, and access to each teaching space.
C	Controls and Energy Management	This section documents the existing controls and energy management systems, components, and their known deficiencies.
E	Electrical Systems	This section documents the existing electrical systems and components, and their known deficiencies.
EQUIP	Capital Equipment/Assets	This section documents the existing capital equipment and assets, and their known deficiencies.
EXT	Exterior Envelope Including Roofing	This section documents the existing exterior building envelope and roofing, including information supplied by the district.
G	Grounds, Site, and Surroundings	This section documents the existing site and its surroundings.
HAZ	Hazardous Materials	This section covers the information provided by the district concerning asbestos materials present and any lead in paint coatings.
INT	Interior Spaces and Finishes	This section documents the existing physical condition of the interior spaces and finishes within the facility.
LS	Life Safety Systems	This section explains existing life safety and code deficiencies as noted and as discovered during field observation.
M	Mechanical Systems	This section documents the existing mechanical systems and components, and their known deficiencies.
P	Plumbing Systems	This section documents the existing plumbing systems and components, and their known deficiencies.

PROG	Programmatic / Educational Adequacy Enhancements	This section consists of facility programmatic and deficiency issues as addressed by the various facilities' site administration and staff.
S	Electronic Security Systems	This section documents the existing electronic security systems and components, and their known deficiencies.
T	Technology Systems - Non-Instructional	This section documents the existing technology systems and components, and their known deficiencies. It covers only non-direct instructional technology infrastructure for the various buildings.
U	Utility Service Improvements	This section documents opportunities for operational cost reduction associated with enhancements to the facilities' utility services.
V	Ventilation / Dehumidification Systems	This section documents the existing ventilation systems and components, and their known deficiencies.

Objectives

West Central Area Schools intends to negotiate a contract with Unesco in good faith and will execute a contract if Unesco can provide the necessary documentation to meet the following objectives:

1. If needed, provide demographic analysis identifying trending enrollment projections for the district.
2. Provide a space adequacy analysis identifying potential future space needs including recommendations and options.
3. Provide Minnesota Department of Education (MDE) required testing and measuring of indoor air quality condition and assist the district in developing the required Indoor Air Quality Plan.
4. Provide the district with an evaluation of the current condition of the existing facility infrastructure and systems to include mechanical, electrical, roofing, life-safety, exterior, hardscape, etc.
5. Provide an energy efficiency analysis identifying energy conservation measures and other facility improvement measures.
6. Provide a description of the operating and maintenance procedures that will affect and reduce the energy and operating costs of the facilities and well as identify any calculated energy and operational savings.
7. Provide a list of alternative utility procurement strategies that will reduce the unit cost of utilities at the facilities.
8. Provide a list of estimated costs to implement the identified energy conservation and facility improvement measures.
9. Assist the district in developing all documentation required by MDE for the use of Health and Safety/Alternative Facility Bonding and Levy programs.
10. Provide financial analyses that include funding and financing options for various project scopes demonstrating how the cost for identified energy conservation and facility improvement measures will be paid for, including but not limited to the Health and Safety/Alternative Facility Bonding and Levy program and which will include the financial and any resultant tax impact to district stakeholders.

If Unesco is unable to deliver a plan that meets the aforementioned objectives, West Central Area Schools will have the option to cancel this agreement with Unesco and will incur no cost. In contrast, if Unesco is able to deliver a report that meets the aforementioned objectives and West Central Area Schools elects not to enter into an agreement with Unesco, West Central Area Schools will be obligated to reimburse Unesco at the rate of \$_____ for the costs they incurred performing the Master Planning analysis.

If after reviewing Unesco's final Master Facility Plan, West Central Area Schools enters into an agreement with Unesco to implement the proposed recommendations, the actual cost for the Master Plan analysis will be rolled into the total program cost.

West Central Area Schools

Date

Unesco, Inc.

Date